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FIBER AND YARN DATA ON SIXTY-TWO RESEARCH COTTON SAMPLES

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CONTENTS

Page

Acknowledgments ii

Abstract 1

Sec.

1. Introduction 1
2. Bulk fiber and bundle tests 1
   - Length measurements 1
   - Tenacity and elongation 2
   - Fineness measurements 2
   - Colorimeter 3
3. Single-fiber properties 3
   - Mechanical properties 3
   - Mechanical properties at different relative humidities 3
   - Comparison of fiber properties from the blended sample and from yarn 3
   - Effect of cyclic loading 3
   - Effect of relaxation 3
   - Tenacity and linear density 3
4. Processing properties 3
   - Neps 3
   - Yarn skein strength 3
   - Uster single-strand strength 4
   - Instron single-strand tenacity 4
   - Effect of cyclic loading 4
   - Yarn abrasion resistance 4
5. Cotton cellulose structure 4
   - Cellulose crystallinity 4
   - Fibrillar orientation 4
6. Properties of array length groups 4
   - Length distribution and Arealometer parameters 4
   - Tenacity and elongation 5
7. Special research studies on cotton samples 5
   - Study of fineness instruments 5
   - Lap properties 5
   - Friction 6
   - Crimp 6
8. References 7
9. Tables 8

Abbreviations, symbols, and definitions 42
- Laboratories contributing data to the research 42
- Growth location codes 42
- Other symbols and abbreviations 42

Identification of cotton (*Gossypium* L.) samples 43

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FIBER AND YARN DATA ON SIXTY-TWO RESEARCH COTTON SAMPLES

Compiled by Reba Lawson[1]

ABSTRACT

In 1957, 62 cotton samples with a wide range of fiber properties were obtained as source material for fiber property research. Initially, measurements of length, strength, and fineness were made on each sample. Part of each was spun into 27-tex yarn for small-skein and single-strand strength determinations. Twenty samples were used in a detailed study of fiber extensibility. Since that time, fibers from these 62 samples have been used in various fiber property investigations. The initial data and representative later data are presented.

SECTION 1.—INTRODUCTION

A series of cotton samples with a wide range of well-determined fiber properties was needed as resource material for specific fiber research projects in several laboratories. Fifty-six samples from the 1957 crop, three from previous crops, and three from the 1958 crop were selected, for a total of 62 samples. These samples were considered representative of the range of cotton fiber properties at that time. Twenty of the samples were used in a research contract at the Textile Research Institute (TRI) and are identified in this publication as "master cotton samples."

From 15 to 25 pounds of each cotton sample was collected and sent to the Cotton Spinning Laboratory, Knoxville, Tenn. (KSL), for processing and storing. Since 1957, these samples have been used for various research projects. The initial and subsequent data collected on them are included here. The purpose of this publication is to make available, in one document, the information collected on these samples.

Ten-pound subsamples of each of the 62 cotton samples were blended and double-carded in a system that produced bundles of sliver about 1 meter long. The sliver was stored in tubes. A well-blended sample equivalent to 72,800 doublings could be obtained by sampling from the end of one of these tubes. Three pounds of each double-carded sample was sent to the Textile Research Institute (TRI) for use in the contract research. The University of Tennessee Fiber Research Laboratory (UT) also received small subsamples.

Of the remaining cotton in each sample, 3 pounds was processed to second-drawing sliver and stored in tubes; 2 pounds was processed into roving, part of which was used in the spinning tests; and the rest was stored.

SECTION 2.—BULK FIBER AND BUNDLE TESTS

Length Measurements

Array Method

In 1958, Agricultural Marketing Service's Cotton Fiber Laboratory (AMS-W) used the Suter-Webb array method (*1*)[2] to determine length and length distribution on second-drawing sliver of the master cotton samples (table 1, AMS-W data).[3] Arrays on second-drawing sliver of each master sample were made in 1971 by Agricultural Marketing Service's Cotton Fiber and Spinning Laboratory (table 1, AMS-C data).

The University of Tennessee Fiber Research Laboratory (UT) made long-method arrays (*1*) on ginned lint in 1960 and the data are shown in the first part of table 2. The second part of table 2 shows array data made on second-drawing sliver in 1960 by a modified short method (*6*) at Agricultural Research Service's Knoxville Cotton Spinning Laboratory (KSL). The long-method array data of table 3 (*1*) on samples 21 to 32 were obtained in 1960 at KSL and UT on second-drawing sliver.

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[1] Physicist, Cotton Fiber Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Knoxville, Tenn. 37916.

[2] Italic numbers in parentheses refer to Section 8, "References."

[3] The tables appear in Section 9.

Fibrograph Method

Data from the Fibrograph method (*3*, *8*, *13*) of determining fiber length are shown in tables 4 and 5. Table 4 presents data on samples 1 to 32 tested on the Servo Fibrograph at Agricultural Research Service's Cotton Fiber Research Laboratory (CFL) in 1960 and 1970. The hand-combed method (*3*) of sample preparation was used on ginned-lint and second-drawing sliver samples. A clamp method of sample preparation, discussed by Worley, Kerr, and Ewald (*31*), was used to make length measurements of mean and upper-half mean (UHM) on second-drawing sliver.

The length measurements in table 5 were made at the UT in 1959 and at KSL in 1970. These data are from specimens of ginned lint prepared on the Fibrosampler (*8*). A manually operated Fibrograph was used to measure the mean and upper-half mean lengths, and Digital Fibrographs were used for the span lengths.

The Digital Fibrograph used in 1959 started scanning the specimen at 0.25 inch from the point where the fibers were held on the comb. This starting point was considered 100 percent and was used in determining 50- and 3.1-percent span lengths. The Digital Fibrograph used in 1970 had an initial or 100-percent starting point of 0.150 inch, which was used to measure 50- and 2.5-percent span lengths. The 3.1- and 2.5-percent span lengths at starting positions of 0.250 and 0.150 inch, respectively, give essentially the same length readings. However, the two 50-percent span length values are quite different, for they are measuring the length at different positions on the Fibrogram curve because of the different starting positions.

Tenacity and Elongation

Tables 6 to 9 show tenacity and elongation data measured on the Stelometer (*7*) and tenacity measured on the Instron (*12*). The Instron is a tensile tester that can be used in the textile field to make stress-strain measurements on single fibers or bundles of fibers, yarns, or fabrics.

In 1958, UT measured the tenacity and elongation of the samples on the Stelometer. All tests were made on ginned lint. The tenacity at 0- and 1/8-inch gages (T_0 and T_1) and the elongation (E_1) are shown in table 6.

Table 7 shows Stelometer T_0, T_1, and E_1 on samples 1 to 32 from double-carded sliver in 1960 and second-drawing sliver in 1970. All data were taken at CFL, and the 1960 data were reported by Rebenfeld (*26*).

In 1968 specimens of ginned lint of the master cottons were tested at 0- and 1/8-inch gage lengths on both the Instron and the Stelometer, by UT (table 8).

Specimen of ginned lint from the master samples were tested on the Stelometer in 1969 at three gage lengths, 1/16, 1/8, and 3/16 inch. These data from KSL, along with the elongation at 1/8-inch gage are shown in table 9. T_0 data from table 8 are repeated to show the fall off of tenacity with increasing gage length.

Tenacity and elongation on sorted length groups are shown in table 33.

Fineness Measurements

Arealometer Method

Both raw stock and double-carded sliver were measured on the Arealometer in 1958 at UT (table 10). The *A* and *D* values of fineness and immaturity were used to calculate the perimeter, *P* and the weight per inch, *W* (*5*, *15*). Table 11 shows Arealometer data on samples 1 to 32 taken in 1960 and 1970 by CFL.

Array Method

The array linear density and maturity data shown in table 12 were taken on double-carded sliver by AMS-W using ASTM method D 1442-54 (*2*). These data were reported by Rebenfeld (*26*).

Micronaire Index

The samples were tested on the Micronaire (*4*) in 1958, 1959, and 1970 by UT, SRRC, and CFL, respectively. UT tested ginned lint, hand-opene second-drawing sliver, and second-drawing sliver blended on a small laboratory blender. The data are shown in table 13.

Table 14 shows fineness on samples 1 to 32 measured on the Port-Ar (*28*) and Speedar II

Both instruments were calibrated to read in Micronaire units. Speedar II was built to measure fineness of the 50-gram miniature spinning sample (*19*).

Colorimeter

The colorimeter data, table 15, were taken on ginned lint in 1970 with a Nickerson-Hunter colorimeter, Spin Lab model 235 (*9, 24*).

SECTION 3.—SINGLE-FIBER PROPERTIES

Mechanical Properties

TRI used the Instron tensile tester at 0.5-inch gage to study the mechanical properties of 50 single fibers of each blended, double-carded master cotton, as described by Wakeham, Virgin, and Spicer (*30*). The elastic modulus, breaking tenacity, and breaking extension were evaluated from the load-extension curve. An automatic vibroscope measured the linear density and cross-sectional area (*22*). The results are shown in table 16.

Mechanical Properties at Different Relative Humidities

Six master samples were selected for single-fiber tests under special conditions. The elastic modulus, break extension, and break stress were examined at three relative humidities (35, 65, and 100 percent), and the results are shown in table 17.

Comparison of Fiber Properties From the Blended Sample and From Yarn

Fibers were removed from the yarn made from the six samples, and the single-fiber mechanical properties of elastic modulus, breaking extension, and breaking stress were measured at 65 percent relative humidity. These data were compared with similar measurements on fibers from the double-carded samples (table 18).

Effect of Cyclic Loading

Fifty fibers on each of the six samples were subjected to a cyclic-loading treatment. Three times the fibers were stressed with 1.5-gram force, and at the fourth cycle of loading, the fibers were stressed to rupture. The effect of cyclic loading on mechanical properties is shown in table 19.

Effect of Relaxation

Mounted fibers of the six samples were subjected to a relaxation treatment, and the mechanical properties were again evaluated. The relaxation treatment involved immersing the unstrained fibers in a bath of distilled water at 50° C for 30 minutes. The data shown in table 20 were taken after the fibers were dried and conditioned to 70° F and 65 percent relative humidity.

Tables 16 to 20 on single-fiber properties are from TRI's final contract report (*26*). A more detailed description of these tests can be found in that report.

Tenacity and Linear Density

An experimental single-fiber breaker, which was developed at UT, measured single-fiber tenacity (table 21). The linear density obtained from the vibroscope on 20 or more fibers on the master cotton samples is also shown. The gage length was not held constant, but it averaged about 0.5 inch.

SECTION 4.—PROCESSING PROPERTIES

Neps

SRRC made nep counts and grade measurements from the Nepotometer photographic standards (*10*). The results are shown in table 22. Neps per grain and grade are not listed on some samples because a complete web was impossible to obtain.

Yarn Skein Strength

The samples were spun into 27-tex yarn (22's cotton count) at KSL. The 1958 data were on a one-half-pound spinning test by the technique described by Landstreet, Ewald, and Kerr (*18*). The 50-gram spinning test was used on the 1970 data (*19*). The essential differences in the two methods were as follows: (1) The 1958 processing included roving, while the 1970 process went directly from third drawing to spinning, and (2) in 1958, 30 miniature skeins were broken on a Scott model J tester. In 1970, 20 skeins were broken on a specially built, automated, digital skein tester (*20*). Two subsamples were tested on each cotton. Each sample was spun at optimum twist multiple, and the skein strength recorded in table 22 was converted to standard skein break in pounds.

Uster Single-Strand Strength

Each of the 20 master cotton samples was spun into 27-tex yarn, using a constant twist multiple of 4.00 and with a twist multiple for maximum skein strength. Uster single-strand strength tests at 20-inch-gage lengths were made at KSL in 1958. Table 23 shows the average break in grams, the coefficient of variation among 100 breaks, and the percent elongation of yarns spun with both constant and optimum twist multiples.

Instron Single-Strand Tenacity

Single-strand tests were made at TRI using the Instron at 10- and 1-inch-gage lengths. The 27-tex yarn was spun at KSL using constant (4.00) and optimum twist multiples. The breaking tenacity, breaking extension, and elastic modulus are shown in tables 24 to 26 and the calculated toughness in table 27.

Effect of Cyclic Loading

Single-strand yarn was subjected to cyclic loading on the Instron with a 10-inch-gage length. Each strand was loaded at a constant rate of extension of 12 inches per minute to a 250-gram force. It was relaxed and reloaded in the same way for three cycles, and it was stressed to the breaking point on the fourth cycle. Table 28 shows the effects of cyclic loading on yarn properties.

Yarn Abrasion Resistance

TRI used the Stoll flex-abrasion tester with low tension and pressure to determine the number of flex-abrasion cycles required to rupture. Five tests were made on each sample on both constant and optimum twist multiple yarns. The means are shown in table 29. A more detailed account of the tests performed at TRI is given by Rebenfeld (*26*).

SECTION 5.—COTTON CELLULOSE STRUCTURE

Cellulose Crystallinity

Three tests were made to evaluate the cellulose crystallinity or accessibility, equilibrium moisture regain at 92 and 65 percent relative humidity, and the loss in weight by the acid hydrolysis method. The loss in weight by acid hydrolysis is an indirect index of cellulose crystallinity (*23, 25*). CQL tested the samples by the equilibrium moisture regain at 92 percent relative humidity. The procedure is given by Marsh and others (*21*). The last two tests were conducted at TRI (*26*). Data on the three methods of evaluating crystallinity are shown in table 30 for the master samples. Samples 21 to 59 were also tested for equilibrium moisture regain at 92 percent relative humidity (table 31).

Fibrillar Orientation

The X-ray angle has been used to measure fibrillar orientation. Table 30 shows data from two methods of determining 40 percent X-ray angle. The CQL data involved densitometer evaluation of photographic X-ray films (*27*). TRI used a direct Geiger counter method (*11, 26*).

SECTION 6.—PROPERTIES OF ARRAY LENGTH GROUPS

Length Distribution and Arealometer Parameters

Tables 32 to 34 present some fiber properties of array length groups and similar data from the ginned lint and double-carded sliver. Data on the ginned lint and double-carded sliver are labeled "Bulk-GL" and "Bulk DCS."

The array data taken by AMS-W in 1958 were used to calculate the length distribution of the sample. The length distribution is presented as the percent of fibers by weight in each length group. The linear density and maturity of each length group within a sample was also determined (*2*).

The samples were sorted into length groups with a Suter-Webb sorter with a modified technique at UT. Length groups were taken directly from the combs instead of laying out on a velvet board. Fibers ending between combs 7 and 8 were considered to be fifteen-sixteenths inch long. Since accumulating a standard Arealometer specimen of 152 milligrams in each length group was too laborious, a system was developed to make the Arealometer measurements on either a 50- or 112-milligram specimen. All data on the sorted lengths were taken on one of the smaller sized specimens. To get more dependable data, each specimen was refluffed and retested. Means of three Arealometer readings on the same test specimen from each sample are reported. The perimeter, *P*, and the weight per inch, *W*, were calculated from *A* and *D* (*5*). Data on the smaller sized specimens are not as reliable as on the standard 152-milligram specimen.

The following method was used to relate the data on the smaller specimens and a standard Arealometer specimen. Fifteen samples with a wide range of fineness readings were tested with 112- and 152-milligram specimens. Data from the two weights were plotted, and the best line through the data was used as a calibration line to convert Arealometer readings on a 112-milligram specimen to square millimeters per cubic millimeter comparable with a 152-milligram specimen. The same procedure was used to get a relationship between 50- and 152-milligram specimens.

All these properties were not measured on each sample. Table 32 shows the array length distribution, linear density, and maturity of cotton samples 1 and 3. Table 33 presents the array length distribution, linear density and maturity, and Arealometer parameters of cotton samples 2 and 4 to 20. Table 34 shows only Arealometer parameters of selected cotton samples.

Tenacity and Elongation

The UT also measured the tenacity of the sorted length groups on the Stelometer at five gage lengths from one thirty-second to five thirty-seconds of an inch, and the means of four test values are shown in table 35. Values for the laboratory standard tested at the same time as the sample are also shown. Elongation of the various fiber lengths was measured at 1/8-inch gage, and the data are presented in table 36.

SECTION 7.—SPECIAL RESEARCH STUDIES ON COTTON SAMPLES[1]

Study of Fineness Instruments

These research samples were used in an extensive study of fineness instruments in 1958. The data are shown in table 37. The Micronaire data of table 13 taken at UT were also part of this study. Measurements were made on ginned lint, second-drawing sliver fluffed by hand, and second-drawing sliver blended on a small laboratory blender. Data in table 37 were taken on a standard Speedar (*16*), a Port-Ar (*28*) and a Speedar modified for straight-through airflow. A 5- to 10-gram sample was compressed on the standard Speedar to a thin layer, one-fourth to one-half inch thick, in a chamber 2-5/8 inches in diameter. In the through-flow Speedar, a 12- to 14-gram sample was compressed to a thickness of 0.9 to 1.1 inches in a chamber 1-7/8 inches in diameter.

Lap Properties

Card Web Lap

The lap measurements were made on the lap obtained in the miniature spinning test (*19*). A 50-gram sample was opened, made into a handformed lap, and carded. Approximately 48 grams of cotton came from the card in a card web 25 centimeters wide. About 30 layers were wound on a drum 150 centimeters in circumference. Lap strength measurements were made on the lap from the drum. Lap, width, thickness and shear friction measurements were made on the doubly folded lap.

Lap Strength

The miniature lap, used in the 50-gram spinning test, was tested for strength on an Instron tester (*12*), which was operated with a crosshead speed of 50 centimeters per minute, a chart speed of 10 centimeters per minute, and a gage length of 3 inches. Lap clamps, 11 inches wide were used to hold the test specimen. The lap strength was tested both parallel and perpendicular to the direction the fibers moved through the card. The peak of the stress-strain curve in grams force was recorded in table 38. The lap tenacity was obtained by dividing the breaking force in grams by the linear density of the lap.

Lap Width

The lap width (table 39) was measured immediately after the lap came from the card.

Lap Thickness

An experimental instrument called a lap micrometer was used to measure the thickness of the lap loaded with 20 grams (T_a), loaded with 420 grams (T_b), and unloaded to 20 grams (T_c). Compressibility and compressional resilience were calculated with the following equations:

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[1] All the research in this section was done at the University of Tennessee Fiber Research Laboratory.

$$\text{Compressibility} = \frac{T_a - T_b}{T_a} \times 100$$

$$\text{Compressional resilience} = \frac{T_c - T_b}{T_a - T_b} \times 100.$$

Lap width, thickness, and compressional properties are shown in table 39.

Friction

Ski-Run Friction

A stainless-steel incline was held in a concave position. A ribbon of fiber wrapped around a small sled was allowed to slide down the incline. The stopping position was noted. The plane was steep at the starting position and horizontal in the last position to give a positive end point. The distance in inches that the fiber-covered sled traveled from the starting position was used as a measure of friction.

Shear Friction

An instrument was developed at UT to measure shear friction. A folded card-web lap, described under "Lap Properties," is placed between two sandpaper-covered plates, which are attached to a pedulum. When the pendulum is allowed to swing, it actuates one of the plates and places the specimen in shear. The loss of energy used in sliding the many fiber-to-fiber contacts is indicated by the decreasing amplitudes of the pendulum. The decrease in amplitude owing to the friction of the moving parts of the instrument is very small compared with the decrease owing to fiber-to-fiber contacts. A correction for instrument friction did not affect the results. The average load, the thickness of the lap, and the amplitudes of the oscillating pendulum are used to calculate the parameter called shear friction.

A picture of the instrument and a more detailed description of the method are given by Hertel (*14*), and the derivation of the empirical formula, which is currently used to calculate shear friction, is given in Hertel, Duckett, and Lawson (*17*).

The shear friction, *S*, is calculated from the empirical formula

$$S = \frac{8.5(A_0 - A_n)^2 T}{n^2 L^{1.44} \sigma^{0.5} (A_0 + A_n)},$$

where A_0 is the initial amplitude, A_n is the nth amplitude, T is the lap thickness, n is the nth swing of the pendulum, L is the average load, and σ is the effective area.

Ski-run friction and shear friction data are shown in table 40.

Penetration

The Penetron is a device to measure how deep a bank of needles will penetrate a miniature card-web lap. Six rows of six needles each were mounted and balanced so that when released they fell simultaneously into the lap of cotton. Calibrated tension wires were attached at one end to a row of needles and on the other to a pointer that indicated on a millimeter scale the average depth all of the needles fell into the lap of cotton. The data at constant pressure were taken with the weight of the Penetron resting on the lap of cotton. A tray, 1-1/8 inches high, was used to compress the lap to a constant thickness. The Penetron rested on the tray, and the needles fell through an opening in the tray to give readings for constant thickness. Penetration data at constant pressure and constant thickness are shown in table 40.

Crimp

Crimp measurements were made on an instrument designed to measure the crimp of a ribbon of fibers. A sample was prepared on the Fibrosampler specimen holder, which was held in a fixed position on the crimpmeter. A 5/16-inch clip, as used for a Stelometer specimen, was mounted on a recessed movable bar perpendicular to the specimen holder. The gage length was set for the 50-percent span length of each individual sample. A 100-gram force was applied to the fibers held in the clip. A vernier scale was used to measure the extension of 0.005 inch, and the percent extension was considered to be the percent crimp. The fibers on each Fibrosampler specimen holder were weighed and the data corrected to a standard weight specimen. Weights of the Stelometer clip specimens would give a better correction, but the design of the equipment and method of taking data made this impossible. The effect of processing on crimp is shown in table 41.

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SECTION 9.—TABLES

The symbols, abbreviations, and cotton identification numbers used in the tables are identified at the end of this publication.

TABLE 1.—*Length and length distribution, master cotton samples, array method (AMS-W, AMS-C)*

ID No.	SDS, 1958 (AMS-W)				SDS, 1971 (AMS-C)			
	UQL (in)	Mean (in)	CV (pct)	Fiber <½ in (pct)	UQL (in)	Mean (in)	CV (pct)	Fiber <½ in (pct)
1	0.773	0.669	22	11	0.82	0.71	21	7
2	.929	.802	22	7	.97	.85	21	5
3	.972	.832	25	9	1.04	.90	23	6
4	.984	.840	24	6	1.11	.97	21	2
5	1.056	.935	19	3	1.09	.96	20	3
6	1.092	.934	26	7	1.13	.97	25	7
7	1.119	.931	28	9	1.17	.98	27	8
8	1.139	.971	26	7	1.16	.98	27	8
9	1.160	.974	27	8	1.19	1.00	26	7
10	1.160	.999	24	6	1.20	1.01	25	6
11	1.163	.959	29	9	1.19	.98	28	9
12	1.185	.998	27	7	1.21	1.01	27	7
13	1.203	1.019	27	8	1.25	1.08	24	5
14	1.243	1.046	28	7	1.26	1.07	27	7
15	1.271	1.015	33	9	1.28	1.05	30	8
16	1.307	1.086	28	6	1.32	1.11	26	5
17	1.418	1.196	27	5	1.46	1.25	24	4
18	1.431	1.174	30	6	1.46	1.19	30	6
19	1.540	1.284	28	5	1.57	1.28	30	6
20	1.561	1.228	35	8	1.62	1.30	31	7

1958 data adapted from Rebenfeld (*26*) and Worley (*31*).

TABLE 2.—*Length and length distribution, master cotton samples, array and short-array methods (UT, KSL)*

ID No.	GL, 1960, long-method array (UT)				SDS, 1960, short-method array (KSL)			
	UQL (in)	Mean (in)	CV (pct)	Fiber <½ in (pct)	UQL (in)	Mean (in)	CV (pct)	Fiber <½ in (pct)
1	0.72	0.60	27	22	0.77	0.67	23	12
2	.93	.81	22	5	.91	.78	23	8
3	.98	.84	26	9	.96	.82	26	9
4	.98	.83	25	5	.97	.82	25	8
5	1.06	.95	18	2	1.04	.93	18	2
6	1.09	.94	25	6	1.07	.90	26	8
7	1.09	.91	29	9	1.09	.91	27	9
8	1.17	1.00	25	6	1.11	.94	27	8
9	1.15	.95	29	10	1.11	.93	27	8
10	1.13	.99	23	4	1.14	.97	25	6
11	1.12	.92	30	10	1.12	.92	31	11
12	1.13	.95	28	8	1.17	.97	27	8
13	1.21	1.03	27	7	1.18	1.00	26	7
14	1.23	1.04	26	6	1.19	.99	28	8
15	1.23	.99	28	11	1.19	.97	31	9
16	1.24	1.02	31	9	1.23	1.02	30	8
17	1.41	1.20	26	5	1.36	1.15	27	5
18	1.44	1.20	28	6	1.37	1.12	31	8
19	1.56	1.34	24	3	1.47	1.20	31	7
20	1.54	1.24	33	8	1.50	1.19	34	9

TABLE 3.—*Length and length distribution, cotton samples 21 to 32, array method (KSL, UT)*

ID No.	SDS, 1960			
	UQL (in)	Mean (in)	CV (pct)	Fiber <½ in (pct)
21	0.809	0.686	24	12
22	.830	.697	27	16
23	1.106	.912	30	10
24	1.116	.982	29	9
25	1.144	.971	26	7
26	1.155	.939	32	10
27	1.167	.981	27	8
28	1.172	.976	26	7
29	1.191	1.000	28	8
30	1.286	1.074	28	7
31	1.303	1.041	34	10
32	1.445	1.154	34	10

Adapted from Worley (*31*).

TABLE 4.—*Fibrograph length, cotton samples 1 to 32, Servo Fibrograph (CFL)*

[Inches]

ID No.	SDS, 1960, clamped		SDS, 1960, hand-combed		SDS, 1970, clamped		GL, 1960, hand-combed		GL, 1970 hand-combed	
	UHM	Mean	UHM	Mean	UHM	Mean	UHM	Mean	UHM	Mean
1	.....	.....	.....	.....	....	....	0.760	0.650	....	....
2	0.944	0.812	0.922	0.790	0.87	0.74	.872	.750	0.85	0.74
3	.968	.817	.965	.822	.91	.75	.940	.802	.88	.75
4	.987	.826	1.022	.850	....	....	.962	.812	....	....
5	1.065	.931	1.032	.900	1.01	.89	.982	.845	.99	.85
6	1.082	.895	1.062	.922	1.00	.83	1.037	.885	1.02	.84
7	1.122	.964	1.072	.922	1.02	.80	1.037	.862	1.02	.84
8	1.139	.983	1.135	.987	1.08	.86	1.090	.935	1.08	.94
9	1.154	.987	1.152	.997	1.08	.88	1.080	.915	1.06	.91
10	1.161	1.003	1.140	.990	1.08	.92	1.085	.940	1.08	.96
11	1.160	.971	1.120	.940	1.04	.80	1.080	.907	1.02	.88
12	1.180	1.005	1.150	.992	1.09	.90	1.097	.925	1.06	.92
13	1.197	1.023	1.200	1.022	1.14	.95	1.135	.965	1.11	.98
14	1.216	1.035	1.205	1.045	1.12	.88	1.177	1.007	1.14	.98
15	1.263	1.050	1.202	.985	1.13	.86	1.197	.962	1.20	.99
16	1.287	1.087	1.237	1.060	1.18	.94	1.195	1.013	1.20	1.02
17	1.399	1.161	1.387	1.192	1.31	1.02	1.332	1.150	1.36	1.17
18	1.433	1.147	1.400	1.157	1.36	1.08	1.405	1.185	1.42	1.23
19	1.527	1.262	1.502	1.310	1.46	1.18	1.477	1.295	1.50	1.32
20	1.511	1.149	1.490	1.200	1.38	.97	1.467	1.140	1.50	1.26
21	.791	.655	.805	.622	....	....	.745	.630	....	....
22	.842	.705	.842	.702	....	....	.762	.630	....	....
23	1.089	.894	1.052	.865	.97	.74	1.002	.815	1.02	.87
24	1.095	.893	1.112	.922	1.10	.92	1.095	.910	1.13	1.00
25	1.104	.903	1.112	.942	....	....	1.017	.827	....	....
26	1.156	.965	1.165	.975	1.06	.81	1.097	.915	1.10	.94
27	1.163	.949	1.140	.977	1.05	.82	1.105	.935	1.10	.94
28	1.138	.949	1.115	.940	1.04	.80	1.067	.885	1.08	.91
29	1.191	.933	1.175	1.015	1.08	.87	1.117	.957	1.12	.98
30	1.275	1.057	1.275	1.110	1.19	.98	1.215	.992	1.21	1.06
31	1.300	.994	1.302	1.062	1.14	.85	1.265	1.002	1.26	1.04
32	1.438	1.134	1.417	1.212	1.26	.93	1.357	1.005	1.34	1.10

1960 data adapted from Worley (*31*).

TABLE 5.—*Fibrograph length, cotton samples 1 to 62, Fibrosampler—Manual and Digital Fibrograph (UT, KSL)*

[Inches]

ID	GL, 1959 (UT)		GL, 1959 (UT)		GL, 1970 (KSL)	
No.	UHM	Mean	3.1-pct SL	50-pct SL	2.5-pct SL	50-pct SL
1	0.70	0.58	0.72	0.42	....	....
2	.87	.73	.88	.50	0.84	0.40
3	.90	.73	.91	.50	.93	.44
4	.93	.75	.96	.51	....	....
5	1.00	.86	.99	.57	1.00	.52
6	1.04	.85	1.04	.57	1.04	.51
7	1.03	.82	1.05	.55	1.04	.48
8	1.08	.87	1.06	.58	1.10	.55
9	1.08	.86	1.08	.58	1.08	.53
10	1.09	.90	1.08	.60	1.06	.55
11	1.04	.79	1.07	.55	1.08	.48
12	1.07	.86	1.08	.57	1.11	.55
13	1.12	.89	1.11	.60	1.13	.57
14	1.16	.94	1.14	.62	1.17	.56
15	1.13	.84	1.18	.57	1.18	.52
16	1.18	.94	1.19	.62	1.17	.54
17	1.34	1.08	1.33	.70	1.38	.69
18	1.39	1.13	1.40	.73	1.41	.70
19	1.49	1.23	1.47	.78	1.46	.76
20	1.46	1.11	1.47	.74	1.46	.66
21	.73	.59	.75	.43	....	....
22	.76	.63	.79	.44	....	....
23	1.01	.77	1.04	.54	1.02	.45
24	1.02	.79	1.05	.55	1.12	.54
25	.96	.73	.99	.52	....	....
26	1.08	.80	1.10	.57	1.08	.49
27	1.07	.82	1.07	.57	1.09	.52
28	1.08	.84	1.10	.58	1.08	.50
29	1.11	.89	1.11	.59	1.08	.52
30	1.17	.90	1.17	.60	1.19	.57
31	1.33	1.02	1.34	.67	1.30	.56
32	1.29	.90	1.32	.64	1.32	.56
33	.75	.59	.77	.43	....	....
34	.98	.78	1.00	.53	....	....
35	1.00	.78	1.02	.53	....	....
36	1.01	.84	1.00	.55	....	....
37	1.01	.79	1.02	.54	....	....
38	1.01	.77	1.05	.55	....	....
39	1.02	.77	1.05	.53	....	....
40	1.03	.76	1.05	.53	....	....
41	1.04	.84	1.04	.55	....	....
42	1.04	.82	1.04	.56	....	....
43	1.05	.80	1.05	.55	....	....
44	1.05	.77	1.07	.54	....	....
45	1.06	.82	1.08	.55	....	....
46	1.06	.85	1.07	.57	....	....
47	1.06	.85	1.07	.57	....	....
48	1.08	.84	1.09	.57	....	....
49	1.08	.88	1.08	.58	....	....
50	1.09	.85	1.10	.57	....	....
51	1.09	.85	1.10	.58	....	....
52	1.09	.82	1.12	.57	....	....

TABLE 5.—*Fibrograph length, cotton samples 1 to 62, Fibrosampler—Manual and Digital Fibrograph (UT, KSL)*—Continued

[Inches]

ID	GL, 1959 (UT)		GL, 1959 (UT)		GL, 1970 (KSL)	
No.	UHM	Mean	3.1-pct SL	50-pct SL	2.5-pct SL	50-pct SL
53	1.09	.83	1.13	.58	....	....
54	1.10	.84	1.12	.58	....	....
55	1.10	.87	1.12	.58	....	....
56	1.13	.85	1.14	.59	....	....
57	1.14	.89	1.16	.60	....	....
58	1.14	.95	1.13	.62	....	....
59	1.17	.92	1.16	.61	....	....
60	1.32	1.05	1.31	.68	....	....
61	1.40	1.17	1.35	.74	....	....
62	1.45	1.18	1.43	.76	....	....

TABLE 6.—*Tenacity and elongation of ginned lint, cotton samples 1 to 62, flat-bundle method (UT), 1958*

ID No.	T_0 (gf/tex)	T_1 (gf/tex)	E_1 (pct)	ID No.	T_0 (gf/tex)	T_1 (gf/tex)	E_1 (pct)
1	34.6	....	....	32	44.0	24.4	6.7
2	33.0	15.2	8.4	33	29.9	....	....
3	43.3	19.2	6.1	34	36.3	19.2	8.4
4	33.8	19.2	11.4	35	31.0	15.8	9.1
5	45.2	26.5	7.7	36	36.1	22.5	11.8
6	31.8	18.1	10.3	37	35.6	18.4	7.5
7	28.9	15.7	11.2	38	32.8	17.5	8.4
8	31.0	16.8	9.8	39	38.1	18.5	7.6
9	47.5	26.3	6.7	40	39.4	19.5	7.1
10	39.1	20.1	6.9	41	45.6	24.0	6.3
11	51.2	26.1	5.7	42	33.3	17.3	9.0
12	39.9	21.2	8.2	43	45.3	22.4	5.9
13	51.2	30.6	6.7	44	36.2	17.3	7.2
14	35.2	20.1	9.8	45	34.6	18.0	8.6
15	36.4	19.5	9.4	46	31.5	17.0	8.6
16	37.9	20.6	8.1	47	46.6	23.4	6.0
17	38.4	23.9	9.1	48	34.7	18.4	8.0
18	44.0	28.3	9.0	49	30.8	16.8	10.0
19	43.8	27.0	8.2	50	39.6	20.4	7.4
20	38.3	23.2	9.5	51	32.5	17.6	8.3
21	33.2	....	....	52	30.6	16.3	9.0
22	33.3	15.1	9.3	53	33.4	17.0	7.7
23	31.9	17.1	8.4	54	34.5	17.8	8.5
24	48.5	25.3	5.8	55	41.8	23.1	7.7
25	37.4	17.4	6.6	56	36.6	19.5	7.4
26	34.7	19.3	9.6	57	38.0	19.9	7.3
27	47.1	24.1	5.8	58	30.5	16.8	9.8
28	34.0	17.8	7.2	59	42.8	22.8	8.1
29	40.3	20.7	7.4	60	44.7	....	....
30	37.8	20.2	8.5	61	45.7	....	....
31	37.8	20.6	9.2	62	40.8	....	....

TABLE 7.—*Tenacity and elongation, cotton samples 1 to 32, flat-bundle method (CFL)*

ID No.	DCS, 1960			SDS, 1970		
	T_0 (gf/tex)	T_1 (gf/tex)	E_1 (pct)	T_0 (gf/tex)	T_1 (gf/tex)	E_1 (pct)
1	37.4	11.8	6.3	....	....	....
2	34.5	14.8	8.0	33.0	15.3	7.8
3	44.3	17.3	5.6	45.2	19.4	5.6
4	35.6	20.3	10.9	....	....	....
5	47.4	26.4	6.9	46.1	25.8	6.6
6	32.0	17.6	10.6	32.0	17.8	9.0
7	30.7	15.5	11.8	30.1	16.0	10.1
8	30.8	16.4	10.0	31.4	16.8	9.3
9	52.2	27.5	6.4	49.0	25.4	6.7
10	40.5	20.0	6.4	41.1	20.8	6.4
11	55.5	26.8	5.6	53.5	26.7	5.6
12	41.9	22.0	8.0	41.2	21.4	7.6
13	57.0	29.8	6.2	53.8	27.9	6.4
14	36.3	18.7	9.4	36.8	19.0	8.6
15	37.8	19.9	9.6	39.4	20.3	8.7
16	41.2	21.8	8.0	39.9	20.0	7.9
17	41.7	24.0	8.8	42.4	24.2	7.9
18	45.5	29.0	8.8	45.7	29.1	8.1
19	46.8	29.2	7.6	46.9	29.0	8.0
20	43.0	24.5	9.1	40.0	23.3	8.8
21	....	....	....	....	....	....
22	....	....	....	....	....	....
23	....	....	....	32.3	16.0	8.2
24	....	....	....	53.3	29.2	6.0
25	....	....	....	....	....	....
26	....	....	....	32.6	17.9	10.1
27	....	....	....	48.3	24.6	5.5
28	....	....	....	35.0	17.8	6.6
29	....	....	....	41.2	20.8	6.8
30	....	....	....	39.0	20.6	8.2
31	41.0	21.8	8.4	40.5	23.2	8.8
32	....	....	....	44.8	24.5	6.2

1960 data adapted from Rebenfeld (*26*).

TABLE 8.—*Tenacity and elongation of ginned lint, master cotton samples, Instron and Stelometer-flat-bundle methods (UT), 1968*

ID No.	Instron (gf/tex)		Stelometer		
	T_0	T_1	T_0 (gf/tex)	T_1 (gf/tex)	E_1 (pct)
2	31.7	13.1	32.8	15.1	7.6
3	39.2	16.5	44.6	19.3	6.0
4	32.2	19.0	35.9	20.8	10.2
5	43.6	24.3	46.2	26.6	7.5
6	30.6	16.6	33.4	18.0	9.8
7	28.1	14.5	31.0	16.1	10.3
8	30.3	16.0	31.4	16.9	9.6
9	45.0	22.2	48.5	27.0	6.9
10	37.6	17.8	40.2	20.4	7.1
11	45.8	22.2	49.8	24.4	6.0
12	39.4	18.8	40.4	22.1	7.4
13	50.6	26.9	52.2	29.9	6.8
14	....	18.0	34.6	19.2	8.6
15	36.1	18.8	35.7	19.8	8.7

TABLE 8.—*Tenacity and elongation of ginned lint, master cotton samples, Instron and Stelometer-flat-bundle methods (UT), 1968*—Continued

ID No.	Instron (gf/tex)		Stelometer		
	T_0	T_1	T_0 (gf/tex)	T_1 (gf/tex)	E_1 (pct)
16	37.7	19.5	39.0	21.1	8.0
17	36.6	23.1	41.8	24.7	8.4
18	44.0	26.8	45.7	28.8	8.2
19	42.6	26.2	46.2	28.6	7.9
20	37.2	22.6	38.6	23.8	8.4

TABLE 9.—*Tenacity and elongation at varying gage lengths, master cotton samples, Stelometer flat-bundle method (UT, KSL)*

ID No.	Tenacity (gf/tex)				E_1
	GL, 1968 (UT)	GL, 1969 (KSL)			GL, 1969 (KSL), 1/8 G (pct)
	0 G	1/16 G	1/8 G	3/16 G	
2	32.8	19.4	15.0	12.6	7.2
3	44.6	24.2	17.5	14.3	5.3
4	35.9	22.8	19.6	17.5	10.0
5	46.2	30.3	24.8	22.3	7.1
6	33.4	19.6	17.0	15.2	8.8
7	31.0	18.1	15.4	13.7	9.8
8	31.4	19.4	16.8	15.0	8.6
9	48.5	31.2	24.6	22.0	7.0
10	40.2	24.0	19.8	16.6	6.6
11	49.8	31.8	25.4	20.3	5.8
12	40.4	24.9	20.0	18.1	7.2
13	52.2	35.4	28.3	23.8	6.5
14	34.6	22.4	18.8	17.5	8.0
15	35.7	23.1	19.8	17.3	8.6
16	39.0	24.6	20.2	17.5	7.2
17	41.8	28.4	23.9	21.2	7.8
18	45.7	32.5	28.4	25.8	7.8
19	46.2	32.6	28.2	25.4	7.6
20	38.6	26.0	23.2	21.0	8.2

TABLE 10.—*Arealometer specific area* (A) *and immaturity* (D), *cotton samples 1 to 62 (UT)*

ID No.	GL, 1958				DCS, 1958			
	A (mm^{-1})	D (mm^{-1})	P (μm)	W (μg/in)	A (mm^{-1})	D (mm^{-1})	P (μm)	W (μg/in)
1	234	..	..	...	237	9	68	11.1
2	339	22	59	6.7	336	22	59	6.8
3	422	25	49	4.5	414	27	52	4.8
4	359	24	57	6.2	365	30	61	6.4
5	347	14	51	5.7	344	17	54	6.1
6	481	44	53	4.2	478	38	50	4.1
7	445	35	53	4.6	435	35	54	4.8
8	443	33	52	4.5	425	37	56	5.1
9	477	36	50	4.0	478	38	50	4.1
10	400	29	55	5.3	392	26	54	5.3
11	515	32	44	3.3	508	37	47	3.6

TABLE 10.—*Arealometer specific area* (A) *and immaturity* (D), *cotton samples 1 to 62 (UT)*—Continued

ID No.	GL, 1958				DCS, 1958			
	A (mm^{-1})	*D* (mm^{-1})	*P* (μm)	*W* (μg/in)	*A* (mm^{-1})	*D* (mm^{-1})	*P* (μm)	*W* (μg/in)
12	485	42	52	4.1	478	41	52	4.2
13	440	25	47	4.2	441	26	48	4.2
14	457	37	52	4.4	452	38	53	4.5
15	415	27	51	4.8	419	27	51	4.7
16	475	36	50	4.0	470	38	51	4.2
17	417	27	51	4.7	408	30	54	5.1
18	475	23	43	3.5	478	25	44	3.5
19	464	28	47	3.9	484	26	44	3.5
20	521	42	48	3.6	515	45	50	3.7
21	306	17	61	7.7	315	19	61	7.5
22	350	26	60	6.7	383	36	62	6.2
23	434	33	53	4.7	435	35	54	4.8
24	561	53	49	3.3	556	50	48	3.3
25	469	40	52	4.3	442	37	54	4.7
26	452	35	52	4.4	471	41	53	4.3
27	471	36	50	4.1	457	34	51	4.3
28	476	44	53	4.3	463	36	51	4.3
29	476	35	49	4.0	462	41	54	4.5
30	488	42	51	4.1	481	38	50	4.0
31	382	24	54	5.5	395	30	56	5.5
32	519	44	49	3.6	515	47	51	3.8
33	298	5	49	6.3	331	17	56	6.6
34	440	38	55	4.8	442	35	53	4.6
35	463	40	53	4.4	451	39	54	4.6
36	322	16	57	6.8	328	24	63	7.4
37	446	33	51	4.4	455	35	51	4.4
38	460	40	53	4.5	453	41	55	4.7
39	477	35	49	4.0	494	39	49	3.8
40	479	39	51	4.1	479	41	52	4.2
41	432	20	45	4.0	435	26	49	4.3
42	425	30	52	4.7	422	31	53	4.8
43	452	29	48	4.1	452	30	49	4.2
44	443	32	51	4.4	440	35	53	4.7
45	457	31	49	4.1	448	30	49	4.3
46	446	40	55	4.8	440	35	53	4.7
47	428	21	46	4.2	429	21	46	4.1
48	437	30	51	4.5	437	30	51	4.5
49	428	32	53	4.8	431	35	54	4.9
50	470	32	48	4.0	472	30	47	3.8
51	450	39	54	4.6	451	39	54	4.6
52	471	44	54	4.4	439	36	54	4.7
53	431	35	54	4.9	441	36	54	4.7
54	517	52	52	3.9	509	52	53	4.0
55	502	40	49	3.8	492	41	50	3.9
56	488	44	52	4.1	488	47	53	4.2
57	454	25	46	3.9	464	31	48	4.0
58	398	30	56	5.4	398	32	57	5.5
59	470	35	50	4.1	470	37	51	4.2
60	501	43	50	3.9	504	47	52	4.0
61	471	34	49	4.0	484	35	48	3.9
62	518	43	49	3.6	506	43	50	3.8

TABLE 11.—*Arealometer specific area* (A) *and immaturity* (D), *cotton samples 1 to 32 (CFL)*

ID No.	DCS, 1960 (mm⁻¹)		SDS, 1970 (mm⁻¹)	
	A	*D*	*A*	*D*
1	...	..	...	..
2	326	12	326	12
3	402	19	406	15
4	352	14	...	..
5	324	8	331	12
6	465	32	465	30
7	436	25	432	22
8	416	26	422	23
9	465	22	458	24
10	383	16	384	16
11	510	25	501	53
12	476	32	479	37
13	434	15	430	16
14	441	26	442	19
15	396	14	408	9
16	459	26	467	26
17	409	15	404	10
18	458	15	469	22
19	468	15	474	20
20	509	32	514	39
21	...	..	...	..
22	...	..	...	..
23	...	..	417	18
24	...	..	456	25
25	...	..	...	..
26	...	..	452	28
27	...	..	442	20
28	...	..	462	39
29	...	..	460	26
30	...	..	480	38
31	394	12	399	34
32	...	..	516	43

1960 data adapted from Rebenfeld (*26*).

TABLE 12.—*Linear density and maturity, master cotton samples, array method (AMS-W), SDS, 1958*

ID No.	Linear density (μg/in)	Maturity (pct)
1	12.1	96
2	7.35	93
3	4.83	85
4	6.36	92
5	5.30	98
6	3.97	75
7	4.78	83
8	5.05	82
9	3.76	81
10	5.14	90
11	3.54	81
12	4.06	79
13	4.01	90
14	4.21	81
15	4.90	90
16	3.92	84
17	4.52	87
18	3.32	91
19	3.08	91
20	3.43	80

Adapted from Rebenfeld (*26*).

TABLE 13.—*Micronaire readings, cotton samples 1 to 62 (UT, SRRC, CFL)*

ID No.	GL, 1958 (UT)	SDS, 1958, opened[1] (UT)	SDS, 1958, blended[2] (UT)	GL, 1959 (SRRC)	GL, 1970 (CFL)
1	(3)	(3)	(3)	(3)	....
2	6.69	6.81	6.97	7.00	6.26
3	5.22	5.36	5.24	5.25	4.71
4	6.28	6.24	6.32	6.45	....
5	6.53	6.65	6.60	6.65	6.05
6	4.36	4.26	4.41	4.50	4.06
7	4.86	5.06	4.92	5.05	4.45
8	4.96	5.21	5.15	4.90	4.69
9	4.32	4.33	4.21	4.70	4.14
10	5.53	5.75	5.64	5.90	5.12
11	3.81	3.95	3.99	4.05	3.50
12	4.26	4.54	4.39	4.05	3.87
13	4.93	4.84	4.79	4.85	4.42
14	4.57	4.72	4.67	4.60	4.28

TABLE 13.—*Micronaire readings, cotton samples 1 to 62 (UT, SRRC, CFL)* —Continued

ID No.	GL, 1958 (UT)	SDS, 1958, opened[1] (UT)	SDS, 1958, blended[2] (UT)	GL, 1959 (SRRC)	GL, 1970 (CFL)
15	5.28	5.30	5.34	5.25	4.63
16	4.40	4.57	4.50	4.35	4.04
17	5.27	5.34	5.40	5.35	4.84
18	4.25	4.28	4.34	4.25	3.98
19	4.42	4.31	4.29	4.15	3.93
20	3.85	3.84	3.89	3.40	3.62
21	7.30	7.20	7.23	7.80	....
22	6.34	5.81	5.95	6.35	....
23	4.88	4.99	4.99	4.90	4.60
24	3.40	3.44	3.41	3.95	4.14
25	4.42	4.87	4.83	4.30	....
26	4.62	4.47	4.40	4.55	4.10
27	4.55	4.64	4.54	4.40	4.09
28	4.34	4.61	4.55	4.40	4.07
29	4.45	4.61	4.63	4.40	4.08
30	4.30	4.39	4.34	4.25	3.80
31	5.64	5.51	5.68	6.15	5.18
32	3.80	3.73	3.83	3.65	3.53
33	7.08	6.90	6.82	7.45	....
34	4.68	4.81	4.80	5.00	....
35	4.71	4.72	4.74	4.75	....
36	6.85	7.15	7.06	7.20	....
37	4.75	4.67	4.61	5.00	....
38	4.73	4.75	4.71	4.85	....
39	4.26	4.18	4.19	4.35	....
40	4.47	4.34	4.22	4.25	....
41	4.92	4.93	4.97	5.30	....
42	5.15	5.18	5.22	5.15	....
43	4.44	4.58	4.59	4.55	....
44	4.77	4.80	4.87	5.00	....
45	4.67	4.81	4.71	4.65	....
46	4.82	4.86	4.82	4.65	....
47	4.86	5.06	5.00	5.05	....
48	4.95	5.04	4.94	4.80	....
49	5.06	5.09	5.11	5.20	....
50	4.36	4.46	4.45	4.45	....
51	4.63	4.82	4.72	4.65	....
52	4.66	4.98	4.96	4.70	....
53	5.00	4.90	4.84	5.05	....
54	4.06	4.03	3.88	3.90	....
55	3.94	4.10	4.11	3.85	....
56	4.17	4.26	4.21	4.05	....
57	4.55	4.64	4.57	4.55	....
58	5.71	5.70	5.77	6.15	....
59	4.42	4.38	4.47	4.35	....
60	....	....	....	4.00	....
61	....	....	....	4.40	....
62	....	....	....	4.15	....

[1] Hand opened.

[2] Blended in a small laboratory blender.

[3] Off scale, coarse.

TABLE 14.—*Fineness by Port-Ar and Speedar II, cotton samples 1 to 32 (CFL, KSL)*

[Micronaire units]

ID No.	Port-AR, DCS, 1960 (CFL)	Speedar II, GL, 1970 (KSL)
1	(1)	(1)
2	6.9	6.50
3	5.2	4.80
4	6.3	....
5	6.6	6.10
6	4.2	4.00
7	4.8	4.50
8	5.2	4.60
9	4.3	4.10
10	5.7	5.25
11	3.6	3.45
12	4.2	3.90
13	4.7	4.50
14	4.6	4.20
15	5.3	4.85
16	4.2	4.00
17	5.1	4.95
18	4.2	4.00
19	4.0	3.90
20	3.7	3.40
21	...	....
22	...	....
23	...	4.55
24	...	4.10
25	...	....
26	...	4.10
27	...	4.10
28	...	4.10
29	...	4.05
30	...	3.90
31	5.8	5.25
32	...	3.30

(1) Off scale, coarse.

Port-Ar data adapted from Rebenfeld (*26*).

TABLE 15.—*Colorimeter data, cotton samples 2 to 32 (KSL), GL, 1970*

ID No.	R_d	$+b$
2	73	10.8
3	68	10.5
4	..	....
5	70	9.5
6	69	12.0
7	72	12.2
8	66	11.0
9	74	11.5
10	73	10.0
11	72	10.8
12	70	12.0
13	68	11.0
14	70	10.0
15	69	11.8
16	74	11.8
17	62	12.8
18	62	11.8
19	66	10.8
20	62	12.5
21	..	....
22	..	....
23	60	8.5
24	72	11.0
25	..	....
26	72	11.0
27	62	9.0
28	62	9.0
29	70	13.0
30	74	11.5
31	72	11.5
32	68	10.8

TABLE 16.—*Single-fiber fineness and mechanical properties, selected cotton samples (TRI)*

ID No.	Cross-sectional area° ($cm^2 \times 10^{-6}$)	Linear density (tex)	Elastic modulus	
			mg/cm² °	gf/tex
1	3.09±0.19	0.476	35.3± 5.7	229
2	1.61± .13	.248	47.3±11.2	308
3	1.19± .09	.183	73.0± 8.6	475
4	1.68± .14	.258	39.2± 5.6	255
5	1.38± .08	.212	68.8± 8.9	447
6	1.21± .09	.186	35.6± 3.8	231
7	1.14± .11	.176	41.1± 7.7	267
8	1.41± .14	.217	37.6± 5.2	244
9	1.12± .09	.172	64.0± 6.1	415
10	1.45± .09	.223	47.7± 8.9	310

TABLE 16.—*Single-fiber fineness and mechanical properties, selected cotton samples (TRI)*—Continued

ID No.	Cross-sectional area* (cm² × 10⁻⁶)	Linear density (tex)	Elastic modulus	
			mg/cm² *	gf/tex
11	1.01± .07	.156	68.7± 8.2	446
12	1.03± .08	.159	56.2± 6.5	365
13	1.02± .07	.157	72.0± 6.2	468
14	1.13± .11	.174	43.1± 5.5	280
15	1.24± .08	.191	49.2± 6.7	320
16	1.16± .08	.179	45.9± 4.9	298
17	1.31± .11	.202	68.4± 9.6	445
18	.84± .05	.129	74.9± 9.4	486
19	.87± .07	.134	88.9±16.3	577
20	1.04± .09	.160	61.1±11.2	397
31	1.30± .09	.200	60.4±10.0	392
56	1.88± .10	.290	35.0± 3.9	227

ID No.	Breaking stress (mg/cm²)	Breaking tenacity (gf/tex)	Breaking extension (pct)	Fiber toughness (gf/tex)
1	2.53±0.35	16.4	5.24±0.43	0.784
2	3.43± .36	22.2	7.91± .90	.878
3	4.66± .68	30.3	5.63± .56	.853
4	3.92± .42	25.4	12.05±1.16	1.524
5	5.44± .48	35.3	8.39± .68	1.481
6	3.44± .36	22.3	10.87±1.06	1.215
7	3.85± .63	25.0	11.60± .88	1.450
8	3.26± .35	21.2	11.12±1.26	1.177
9	4.58± .56	29.7	6.46± .65	.959
10	4.16± .43	27.0	7.78± .77	1.050
11	4.52± .66	29.3	5.35± .63	.784
12	4.92± .74	31.9	8.01± .88	1.278
13	5.65± .61	36.7	6.26± .50	1.149
14	3.99± .45	25.9	9.72±1.12	1.259
15	4.22± .68	27.4	8.76± .98	1.200
16	4.45± .48	28.9	9.21± .79	1.331
17	4.60± .51	29.8	8.97±1.00	1.336
18	6.44± .60	41.8	9.82± .89	2.052
19	6.46± .59	42.0	9.35± .76	1.963
20	5.43±1.09	35.3	10.24±1.20	1.800
31	4.77± .65	31.0	8.27±1.21	1.282
56	5.11± .55	33.2	13.09±1.06	2.170

* 95-pct confidence level.
Adapted from Rebenfeld (*26*).

TABLE 17.—*Single-fiber mechanical properties at specified relative humidities, six master cotton samples (TRI)*

ID No.	Elastic modulus (mg/cm²) at—			Break extension (pct) at—			Break stress (mg/cm²) at—		
	35 RH	65 RH	100 RH	35 RH	65 RH	100 RH	35 RH	65 RH	100 RH
3	68.5	73.0	26.6	4.33	5.63	7.16	2.89	4.66	3.67
6	47.1	35.6	17.7	7.72	10.9	12.5	2.93	3.44	4.03
7	43.7	41.1	10.9	7.57	11.6	15.2	2.48	3.85	3.10
12	54.2	56.2	25.5	6.01	8.01	9.36	3.30	4.92	4.15
13	85.1	72.0	40.6	4.82	6.26	7.20	4.34	5.65	5.25
16	58.7	45.9	25.4	5.57	9.21	9.92	2.70	4.45	4.18
Average....	59.6	54.0	24.4	6.00	8.60	10.2	3.11	4.50	4.01

Adapted from Rebenfeld (*26*).

TABLE 18.—*Comparison of single-fiber mechanical properties of DCS and yarn, six blended master samples (TRI)*

ID No.	Elastic modulus (mg/cm²)		Break extension (pct)		Break stress (mg/cm²)	
	DCS	Yarns	DCS	Yarns	DCS	Yarns
3	73.0	93.9	5.63	4.87	4.66	3.94
6	35.6	73.5	10.9	9.11	3.44	4.13
7	41.1	60.4	11.60	10.76	3.85	3.71
12	56.2	83.4	8.01	7.15	4.92	4.73
13	72.0	112.8	6.26	5.19	5.65	5.27
16	45.9	74.7	9.21	6.63	4.45	3.95
Average................	54.0	83.2	8.60	7.28	4.50	4.29

Adapted from Rebenfeld (*26*).

TABLE 19.—*Effect of cyclic loading on single-fiber properties, six master samples (TRI)*

ID No.	Permanent set (pct)	Energy hysteresis (mg/cm²)	Elastic modulus (mg/cm²)		Break extension (pct)		Break stress (mg/cm²)	
			Cycle 1	Cycle 4	Cycle 1	Cycle 4	Cycle 1	Cycle 4
3	0.8	28.2	65.6	107.6	5.63	4.70	4.66	4.10
6	2.2	53.4	48.4	84.8	10.90	8.02	3.44	4.36
7	4.1	53.4	30.6	73.9	11.60	8.88	3.85	3.61
12	2.2	50.6	51.2	110.8	8.01	6.41	4.92	5.06
13	1.1	33.1	78.0	130.3	6.26	5.14	5.65	5.44
16	1.0	38.7	62.7	104.6	9.21	6.48	4.45	4.94
Average	1.9	42.9	56.1	102.0	8.60	6.60	4.50	4.58

Adapted from Rebenfeld (*26*).

TABLE 20.—*Effect of relaxation on single-fiber properties, six master samples (TRI)*

ID No.	Elastic modulus (mg/cm²)		Break extension (pct)		Break stress (mg/cm²)	
	Initial	Relaxed	Initial	Relaxed	Initial	Relaxed
3	73.0	51.4	5.63	6.78	4.66	4.11
6	35.6	35.0	10.9	12.8	3.44	3.98
7	41.1	28.2	11.60	12.20	3.85	3.14
12	56.2	45.2	8.01	8.75	4.92	4.30
13	72.0	58.4	6.26	6.80	5.65	4.82
16	45.9	44.5	9.21	9.28	4.45	4.34
Average................	54.0	44.0	8.60	9.44	4.50	4.12

Adapted from Rebenfeld (*26*).

TABLE 21.—*Single-fiber tenacity and linear density, master cotton samples (UT)*

ID No.	GL, 1967	
	Tenacity (gf/tex)	Linear density (tex)
1	16.1	0.479
2	11.7	.631
3	16.3	.367
4	21.5	.376
5	24.1	.374
6	17.2	.272
7	18.9	.323
8	17.2	.359
9	27.4	.270
10	27.7	.248
11	21.6	.292
12	21.7	.286
13	21.9	.314
14	1.96	.302
15	27.2	.287
16	26.0	.234
17	21.4	.383
18	30.8	.264
19	30.6	.269
20	21.2	.284

TABLE 22.—*Neps, grade, and yarn strength by the skein method, cotton samples 1 to 62 (SRRC, KSL)*

ID No.	Neps/grain, 1959 (SRRC)	Nepotometer grade, 1959 (SRRC)	Yarn strength (lb)		
			½-lb test, 1958 (KSL)	50-g test, 1960 (KSL)	50-g test, 1970 (KSL)
1	(1)	(1)	34	...	...
2	(1)	(1)	86	91	80
3	9.8	1.3	117	125	113
4	(1)	(1)	99	103	...
5	.7	1.0	145	151	144
6	30.8	2.0	117	123	112
7	9.5	1.3	105	106	98
8	5.2	1.3	105	109	106
9	16.0	1.5	167	160	151
10	3.5	1.2	124	128	124

TABLE 22.—*Neps, grade, and yarn strength by the skein method, cotton samples 1 to 62 (SRRC, KSL)*—Continued

ID No.	Neps/grain, 1959 (SRRC)	Nepotometer grade, 1959 (SRRC)	Yarn strength (lb)		
			½-lb test, 1958 (KSL)	50-g test, 1960 (KSL)	50-g test, 1970 (KSL)
11	74.4	3.0	170	160	155
12	13.7	1.7	144	150	138
13	18.4	1.7	184	172	172
14	13.0	1.7	131	127	124
15	(1)	1.3	114	107	112
16	23.4	1.7	151	146	138
17	3.5	1.0	150	144	150
18	(1)	3.0	183	186	184
19	(1)	4.0	188	200	194
20	(1)	3.0	154	159	145
21	(1)	(1)	51	...	...
22	(1)	1.3	67	...	...
23	6.0	1.3	98	97	94
24	59.8	3.0	160	174	166
25	15.6	1.7	123	122	...
26	20.7	1.7	124	121	112
27	22.0	2.3	146	147	139
28	27.6	2.0	121	118	104
29	15.4	1.7	146	145	136
30	28.6	2.2	147	144	140
31	(1)	(1)	118	...	114
32	148.0	4.0	171	168	152
33	(1)	(1)	61	...	...
34	8.4	1.3	119	122	...
35	8.4	1.3	101	106	...
36	(1)	(1)	114	...	...
37	21.2	2.0	122	120	...
38	8.0	1.3	114	115	...
39	31.6	2.2	127	123	...
40	42.8	2.0	124	126	...
41	18.2	1.7	156	148	...
42	8.7	1.3	114	116	...
43	33.0	2.5	142	140	...
44	9.0	1.3	108	109	...
45	19.4	2.0	118	116	...
46	30.6	2.0	111	108	...
47	11.5	1.3	150	148	...
48	7.9	1.3	118	124	...
49	8.6	1.3	105	113	...
50	32.8	2.0	143	139	...
51	9.2	1.3	116	115	...
52	8.9	1.3	101	94	...
53	9.6	1.3	103	100	...
54	30.5	2.3	116	121	...
55	38.1	2.2	157	155	...
56	21.6	1.7	130	126	...
57	56.0	3.0	139	137	...
58	(1)	1.0	107	108	...
59	29.8	2.0	164	161	...
60	31.0	2.0	156	...	...
61	8.4	1.5	175	...	...
62	17.2	1.5	164	...	...

[1] Unable to complete web.

½-lb yarn strength data adapted from Rebenfeld (*26*).

TABLE 23.—*Uster single-strand yarn strength and elongation, master cotton samples, 1958 (KSL)*

ID No.[1]	4.0 TM			TM for maximum skein strength			
	Break (g)	Break CV (pct)	Elongation (pct)	Break (g)	Break CV (pct)	Elongation (pct)	TM
1	(2)	(2)	(2)	217	18.0	6.1	5.54
2	292	13.0	8.4	438	8.7	7.2	5.04
3	427	10.9	6.3	396	12.4	5.9	4.26
4	348	14.7	8.5	347	12.7	8.3	4.44
5	504	11.7	6.8	483	12.4	6.8	4.35
6	393	10.2	8.8	394	10.7	8.1	3.87
7	386	10.5	9.0	369	10.9	8.7	3.94
8	337	13.7	8.2	359	11.0	7.9	3.87
9	593	10.0	7.0	532	10.7	6.5	3.80
10	453	8.8	7.1	419	10.0	6.5	3.87
11	557	8.1	6.7	546	8.8	6.2	3.73
12	501	9.0	7.5	466	10.3	7.0	3.73
13	633	8.7	. . .	623	10.3	6.6	3.73
14	469	9.4	8.4	466	9.0	8.1	3.73
15	403	10.8	8.1	400	13.3	7.7	3.94
16	502	9.0	8.0	504	9.3	7.3	3.73
17	519	9.7	8.1	509	10.2	7.6	3.66
18	614	10.3	8.2	585	13.1	7.6	3.66
19	600	10.3	8.4	623	14.0	7.5	3.66
20	514	8.2	8.3	498	8.2	8.1	3.66

[1] Sample Nos. 1 and 2 were spun with reduced tension; that is, low speed and light travelers.

[2] Sample No. 1 could not be spun at 4.0 TM.

Adapted from Rebenfeld (*26*).

TABLE 24.—*Instron single-strand breaking tenacity, master cotton samples (TRI)*

[Grams-force per tex]

ID No.	10-inch test length[1]		1-inch test length[1]		Average
	Constant TM	Optimum TM	Constant TM	Optimum TM	
1	(2)	6.6±0.7	(2)	9.9±1.9	8.2
2	9.8±0.8	12.1±1.2	10.1±1.7	14.5±1.4	11.6
3	13.8±1.4	14.7±1.3	17.5±3.3	17.0±2.2	15.8
4	10.8±1.1	12.2±1.0	13.0±1.5	14.3±1.2	12.6
5	19.1±1.7	18.8±1.8	21.4±2.1	22.1±2.9	20.4
6	15.4±1.2	14.8±1.1	15.9± .9	19.4±2.5	16.4
7	12.1± .9	12.4± .9	14.1±1.5	14.9±1.4	13.4
8	13.2±1.0	13.0± .9	18.2±4.0	14.6±1.3	14.7
9	22.5±1.4	22.2±1.4	24.2±2.1	25.9±1.8	23.7
10	14.8±1.2	14.8±1.4	18.7±1.7	19.0±1.4	16.8
11	21.9±1.2	19.7±2.3	24.0±1.9	23.4±1.8	22.2
12	17.2±1.1	17.6±1.2	18.0±1.3	21.6±3.0	18.6
13	23.3±1.4	23.2±1.5	27.0±2.2	24.0±1.3	24.4
14	16.7±1.1	17.2±1.4	17.7±2.1	18.5±1.4	17.6
15	12.4±1.5	13.2±1.3	15.5±1.4	15.7±1.3	14.1
16	18.3± .9	17.9±1.4	22.5±2.1	20.8±1.3	19.9
17	19.2±1.1	19.1±1.8	20.2±1.5	21.7±2.6	20.0
18	23.3±2.3	22.5±2.1	22.0±3.0	23.4±2.0	22.8
19	24.2±2.4	22.8±2.2	29.8±2.9	25.8±2.5	25.7
20	17.8±1.5	17.0±2.9	21.8±3.1	21.0±2.0	19.4

[1] 95-pct confidence level.

[2] Sample No. 1 could not be spun at 4.0 TM.

Adapted from Rebenfeld (*26*).

TABLE 25.—*Instron single-strand breaking extension, master cotton samples (TRI)*

[Percent]

ID No.	10-inch test length[1]		1-inch test length[1]		Average
	Constant TM	Optimum TM	Constant TM	Optimum TM	
1	(2)	7.22±0.45	(2)	7.60±0.61	7.41
2	6.67±0.66	7.15± .55	7.20±0.59	8.20± .65	7.32
3	5.55± .30	5.09± .24	6.58± .58	6.10± .47	5.83
4	8.27± .74	7.51± .63	9.76± .53	9.66± .71	8.81
5	6.08± .50	5.90± .30	7.74± .54	7.66± .90	6.84
6	8.14± .53	7.19± .44	9.63± .73	9.89± .48	8.71
7	8.14± .90	8.19± .15	9.82± .68	10.07± .57	9.06
8	7.72± .37	6.95± .39	9.09± .65	9.48± .42	8.31
9	6.01± .25	5.47± .65	7.46± .53	7.13± .41	6.52
10	6.23± .36	5.48± .35	7.72± .47	7.44± .55	6.72
11	5.29± .24	5.03± .34	6.45± .21	6.52± .88	5.82
12	6.83± .28	6.41± .48	8.41± .44	8.16± .36	7.45
13	5.70± .28	5.45± .14	6.92± .34	6.51± .42	5.90
14	7.23± .27	7.40± .45	10.45±1.18	8.74± .68	8.46
15	6.78± .51	6.75± .43	7.99± .67	8.08± .61	7.40
16	7.01± .35	6.46± .32	8.69± .61	8.36± .54	7.63
17	6.44± .30	6.56± .29	9.41±1.10	8.46± .72	7.72
18	7.47± .42	6.79± .28	9.21± .99	8.61± .55	8.02
19	7.05± .41	6.91± .28	9.04± .73	8.75± .55	7.94
20	7.69± .52	7.09± .46	9.52± .69	9.25± .58	8.39

[1] 95-pct confidence level.

[2] Sample No. 1 could not be spun at constant (4.0) TM.

Adapted from Rebenfeld (*26*).

TABLE 26.—*Instron single-strand elastic modulus, master cotton samples (TRI)*

[Grams-force per tex]

ID No.	10-inch test length[1]		1-inch test length[1]		Average
	Constant TM	Optimum TM	Constant TM	Optimum TM	
1	(2)	79± 7	(2)	113±24	96
2	141±17	191±12	143±20	177±16	163
3	228± 9	269±28	229±24	290±44	254
4	154±10	204± 9	155±19	162±13	169
5	307±19	304±16	267±21	279±34	289
6	226±17	234±17	194±14	210±20	216
7	181±11	204±13	177±18	177±22	185
8	231±15	231±20	185±18	176±18	206
9	304±24	410±93	288±15	316±22	330
10	209±11	280±11	246±30	234±25	242
11	361±40	338±22	319±14	322±32	335
12	219±10	276±19	197±16	247±29	235
13	308±20	344±27	310±19	318±23	320
14	239±21	246±14	184±36	226±20	224
15	232±23	231±13	215±24	200±15	220
16	256±18	278±25	253±24	240±37	258
17	312±20	294±23	226±20	256±28	272
18	268±19	308±22	256±31	268±52	275
19	304±14	312±19	316±14	277±18	302
20	218±15	261±31	236±29	230±29	236

[1] 95-pct confidence level.

[2] Sample No. 1 could not be spun at constant (4.0) TM.

Adapted from Rebenfeld (*26*).

TABLE 27.—*Instron single-strand toughness, master cotton samples (TRI)*

[Grams-force per tex]

ID No.	10-inch test length: Constant TM	10-inch test length: Optimum TM	1-inch test length: Constant TM	1-inch test length: Optimum TM	Average
1	(1)	0.238	(1)	0.377	0.308
2	0.328	.432	0.363	.593	.429
3	.383	.374	.577	.519	.464
4	.446	.458	.635	.692	.558
5	.582	.555	.828	.847	.703
6	.627	.531	.765	.960	.720
7	.492	.507	.693	.797	.622
8	.510	.348	.827	.693	.594
9	.675	.605	.902	.924	.776
10	.461	.406	.722	.707	.574
11	.579	.495	.773	.767	.653
12	.587	.564	.755	.880	.672
13	.667	.631	.935	.780	.754
14	.604	.636	.925	.808	.743
15	.412	.446	.619	.634	.528
16	.642	.579	.977	.870	.768
17	.619	.627	.950	.920	.779
18	.870	.765	1.015	1.010	.915
19	.853	.788	1.346	1.128	1.029
20	.684	.603	1.038	.970	.824

[1] Sample No. 1 could not be spun at constant (4.0) TM.

Adapted from Rebenfeld (*26*).

TABLE 28.—*Effect of cyclic loading on yarn properties, master cotton samples (TRI)*

ID No.	Permanent set (pct)	Elastic modulus (gf/tex): Cycle 1	Elastic modulus (gf/tex): Cycle 4	Break tenacity (gf/tex): Cycle 1	Break tenacity (gf/tex): Cycle 4	Break extension (pct): Cycle 1	Break extension (pct): Cycle 4
1	0.60	86	117	6.6	5.6	7.2	4.9
2	.80	94	115	9.8	9.9	6.7	7.0
3	2.58	248	557	13.8	14.2	5.6	3.1
4	4.75	185	420	10.8	10.7	8.3	3.6
5	2.86	304	650	19.1	19.6	6.1	3.9
6	2.88	254	445	15.4	14.3	8.1	4.2
7	4.17	187	404	12.1	12.5	8.1	4.2
8	3.86	231	444	13.2	14.0	7.7	4.2
9	2.28	264	655	22.5	22.9	6.0	4.1
10	2.58	227	497	14.8	15.2	6.2	3.6
11	2.18	348	661	21.9	21.0	5.3	3.0
12	2.17	242	527	17.2	19.7	6.8	4.8
13	1.59	283	596	23.3	22.4	5.7	4.3
14	2.88	240	485	16.7	16.0	7.2	4.3
15	3.46	250	495	12.4	13.8	6.8	3.8
16	2.28	282	549	16.7	19.3	7.0	4.7
17	2.18	281	540	19.1	19.1	6.4	4.6
18	2.17	288	577	23.3	22.5	7.5	4.9
19	1.88	314	582	24.2	22.8	7.0	4.6
20	2.87	250	545	17.7	18.8	7.7	4.4

Adapted from Rebenfeld (*26*).

TABLE 29.—*Yarn abrasion resistance, master cotton samples (TRI)*

[Cycles to rupture]

ID No.	Constant TM	Optimum TM	Average
1	(1)	51	51
2	57	101	79
3	91	111	101
4	63	121	92
5	182	212	197
6	195	281	238
7	179	171	175
8	220	208	214
9	369	303	336
10	172	231	202
11	372	253	312
12	365	287	326
13	317	380	348
14	497	419	458
15	237	191	214
16	310	406	358
17	732	523	628
18	724	630	677
19	869	960	914
20	443	684	564

[1] Sample No. 1 could not be spun at constant (4.0) TM.
Adapted from Rebenfeld (*26*).

TABLE 31.—*Equilibrium moisture regain at 92-percent relative humidity, cotton samples 21 to 59 (CQL)*

ID No.	Regain (pct)	ID No.	Regain (pct)
21	15.2	41	14.9
22	....	42	16.0
23	16.2	43	14.5
24	15.6	44	14.3
25	15.1	45	14.3
26	16.3	46	15.5
27	14.3	47	14.3
28	15.8	48	15.3
29	15.9	49	15.9
30	15.7	50	15.1
31	....	51	15.7
32	16.4	52	14.6
33	....	53	14.7
34	15.0	54	16.0
35	15.8	55	16.3
36	....	56	15.9
37	15.5	57	13.8
38	15.7	58	15.5
39	14.9	59	16.0
40	15.2		

TABLE 30.—*Cotton cellulose structure, master cotton samples (CQL, TRI)*

ID No.	Equilibrium moisture regain (pct) at—		Loss in weight,[1] acid hydrolysis, TRI (pct)	X-ray angle (degrees)	
	92 RH (CQL)	65 RH (TRI)		(TRI)	(CQL)
1	16.2	....	13.25±0.35	27.2	27.0
2	14.5	....	....	27.7	28.4
3	15.0	6.26	11.67± .21	27.7	28.4
4	14.7	....	11.67± .14	39.0	37.4
5	14.2	....	....	29.8	31.2
6	16.3	6.52	13.78± .10	39.6	37.8
7	15.9	6.42	12.79± .21	41.8	41.8
8	16.2	....	....	38.3	38.8
9	16.7	....	12.74± .44	29.6	31.8
10	15.9	....	....	32.5	31.7
11	16.0	....	12.76± .27	26.2	27.6
12	15.6	6.42	13.59± .38	33.7	32.6
13	15.6	6.36	12.14± .16	26.3	26.6
14	15.3	....	....	37.3	38.0
15	15.1	....	....	36.0	34.0
16	16.3	6.50	12.88± .24	33.7	33.5
17	14.6	....	12.18± .35	35.0	34.8
18	15.4	....	12.39± .31	31.8	32.1
19	15.0	....	12.17± .30	30.8	30.2
20	15.5	....	....	35.2	35.2

[1] 95-pct confidence level.
Adapted from Rebenfeld (*26*).

TABLE 32.—*Array length distributions,[1] linear density, and maturity, cotton samples 1 and 3 (AMS-W)*

Length group (1/16 in.)	ID No. 1 array			ID No. 3 array		
	Length dist. (pct)	Fineness (μg/in)	Maturity (pct)	Length dist. (pct)	Fineness (μg/in)	Maturity (pct)
<3	0.49	....	..	0.62	...	..
3	1.06	....	..	1.42	...	..
5	2.56	19.0	96	2.94	4.3	74
7	6.49	14.7	96	4.05	5.2	69
9	20.78	13.5	95	5.29	5.0	76
11	38.57	12.1	98	9.79	5.4	89
13	26.83	10.8	98	24.56	5.3	88
15	3.22	9.8	98	33.76	4.8	90
17	.....	....	..	15.88	4.1	87
19	.....	....	..	1.69	3.9	87
Bulk DCS[2]	.....	12.1	96	.....	...	..

[1] Length distributions from Rebenfeld (*26*).

[2] Data on fiber mass that had not been sorted into length groups.

TABLE 33.—*Array length distribution, linear density and maturity, and Arealometer parameters of array length groups, samples 2 and 4 to 20 (AMS-W, UT)*[1]

Length group[3] (1/16 in)	Array			Arealometer[2]			
	Length dist. (pct)	Fineness (μg/in)	Maturity (pct)	*A* (mm^{-1})	*D* (mm^{-1})	*P* (μm)	*W* (μg/in)
			ID No. 2				
<3	0.36	...	..	341	22	59	6.6
3	.94	...	..				
5	2.01	9.8	86				
7	3.44	8.6	89				
9	5.99	8.9	93				
11	17.29	8.5	98	316	20	62	7.5
13	31.81	7.5	94	325	21	61	7.2
15	30.07	6.8	93	344	29	64	7.1
17	8.09	5.8	91	369	35	63	6.6
Bulk GL	.....	...	..	339	22	58	6.7
Bulk DCS	.....	7.4	94	336	22	59	6.8
			ID No. 4				
<3	0.36	...	..	371	24	56	5.8
3	.62	...	..				
5	1.51	8.2	80				
7	3.78	6.7	78				
9	7.97	7.4	90				
11	13.12	6.8	94	357	29	61	6.6
13	26.82	6.6	95	350	23	58	6.4
15	23.89	6.1	93	360	30	61	6.6
17	15.61	5.9	94	364	27	59	6.2
19	6.32	5.6	97	380	30	58	5.9
Bulk GL	.....	...	..	359	24	57	6.2
Bulk DCS	.....	6.4	92	365	30	61	6.4

See footnotes at end of table.

TABLE 33.—*Array length distribution, linear density and maturity, and Arealometer parameters of array length groups, samples 2 and 4 to 20 (AMS-W, UT)*[1]—Continued

Length group[3] (1/16 in)	Array			Arealometer[2]			
	Length dist. (pct)	Fineness (μg/in)	Maturity (pct)	A (mm^{-1})	D (mm^{-1})	P (μm)	W (μg/in)
				ID No. 5			
<3	0.31	...	..	...	..	..	...
3	.62	...	..	...	..	..	...
5	.80	9.0	94	...	..	..	...
7	1.29	8.9	96	...	..	..	...
9	2.35	6.9	98	...	..	..	...
11	6.83	6.2	96	326	6	46	5.4
13	13.48	5.8	99	332	20	59	6.8
15	35.83	5.3	100	336	18	56	6.4
17	30.46	4.8	97	350	23	58	6.4
19	7.36	4.8	98	372	19	52	5.4
21	.67	...	..	...	..	..	...
Bulk GL	.....	...	..	347	14	51	5.7
Bulk DCS	.....	5.3	98	344	17	54	6.1
				ID No. 6			
<3	0.58	...	..	...	..	..	...
3	1.16	...	..	...	..	..	...
5	2.23	2.7	53	...	..	..	...
7	2.99	2.9	52	...	..	..	...
9	4.59	3.8	63	...	..	..	...
11	6.24	4.5	76	504	39	48	3.7
13	10.62	4.7	86	461	25	45	3.8
15	21.68	4.1	84	440	34	52	4.6
17	34.08	4.1	82	450	37	53	4.6
19	13.47	3.8	75	485	53	56	4.5
21	2.36	3.2	74	...	..	..	...
Bulk GL	.....	...	..	481	44	53	4.2
Bulk DCS	.....	4.0	75	478	38	50	4.0
				ID No. 7			
<3	0.62	...	..	470	25	44	3.6
3	1.60	...	..				
5	2.49	4.3	66				
7	4.10	4.3	74				
9	5.26	4.9	77				
11	7.79	5.0	81	446	45	58	5.0
13	9.62	5.4	86	412	31	54	5.1
15	17.85	5.1	90	416	38	58	5.4
17	27.43	4.9	86	419	39	58	5.3
19	18.34	4.4	90	439	40	56	4.9
21	4.90	4.2	86	450	41	55	4.7
Bulk GL	.....	...	..	445	35	52	4.6
Bulk DCS	.....	4.8	84	435	35	54	4.8

See footnotes at end of table.

TABLE 33.—*Array length distribution, linear density and maturity, and Arealometer parameters of array length groups, samples 2 and 4 to 20 (AMS-W, UT)*[1]—Continued

Length group[3] (1/16 in)	Array			Arealometer[2]			
	Length dist. (pct)	Fineness (μg/in)	Maturity (pct)	*A* (mm^{-1})	*D* (mm^{-1})	*P* (μm)	*W* (μg/in)
			ID No. 8				
<3	0.53	. . .	. .	457	41	54	4.6
3	1.42	. . .	. .				
5	2.18	5.4	74				
7	2.71	4.6	74				
9	4.13	5.2	73				
11	5.69	5.2	78	439	38	55	4.8
13	8.80	5.4	83	417	33	55	5.1
15	14.80	5.3	85	410	37	58	5.5
17	32.27	5.2	86	404	33	57	5.4
19	22.04	4.8	86	422	34	55	5.0
21	4.76	4.5	84	437	42	57	5.1
23	.67	. . .	. .	. . .	. .	. .	. . .
Bulk GL	. . . . .	. . .	. .	429	34	54	4.8
Bulk DCS	. . . . .	5.0	82	425	37	56	5.1
			ID No. 9				
<3	0.71	. . .	. .	528	39	46	3.4
3	1.52	. . .	. .				
5	2.10	3.4	67				
7	3.61	3.8	69				
9	3.61	3.8	65				
11	5.57	4.1	74	490	36	48	3.8
13	9.23	4.0	78	470	37	51	4.2
15	15.43	4.0	89	454	35	52	4.4
17	26.48	3.9	87	455	36	52	4.4
19	23.14	3.6	86	461	32	49	4.1
21	7.58	3.4	84	477	33	48	3.9
23	1.02	3.2	92	. . .	. .	. .	. . .
Bulk GL	. . . . .	. . .	. .	477	36	50	4.0
Bulk DCS	. . . . .	3.8	80	478	38	50	4.0
			ID No. 10				
<3	0.58	. . .	. .	442	30	50	4.4
3	.84	. . .	. .				
5	1.60	4.8	72				
7	2.67	5.8	78				
9	2.62	5.9	82				
11	4.76	6.2	86	403	19	48	4.6
13	8.49	6.0	92	388	27	55	5.5
15	14.67	5.6	92	371	25	56	5.8
17	31.60	5.3	95	371	25	56	5.8
19	25.24	4.6	90	395	32	57	5.6
21	6.93	4.4	90	428	44	59	5.4
Bulk GL	. . . . .	. . .	. .	400	29	55	5.3
Bulk DCS	. . . . .	5.2	90	392	26	54	5.3

See footnotes at end of table.

TABLE 33.—*Array length distribution, linear density and maturity, and Arealometer parameters of array length groups, samples 2 and 4 to 20 (AMS-W, UT)*[1]—Continued

Length group[3] (1/16 in)	Array			Arealometer[2]			
	Length dist. (pct)	Fineness (μg/in)	Maturity (pct)	A (mm^{-1})	D (mm^{-1})	P (μm)	W (μg/in)
			ID No. 11				
<3	0.80	...	..	596	60	48	3.1
3	1.65	...	..				
5	2.81	3.0	60				
7	4.06	2.9	69				
9	3.70	3.3	67				
11	6.20	3.8	78	539	35	43	3.1
13	9.77	3.7	77	508	37	47	3.6
15	14.81	3.8	89	472	31	47	3.9
17	23.64	3.7	92	466	31	48	4.0
19	25.29	3.4	90	471	32	48	3.9
21	6.51	3.2	88	490	48	54	4.2
23	.76	...	..	...	..	..	...
Bulk GL	.....	...	..	515	32	44	3.3
Bulk DCS	.....	3.6	82	508	37	47	3.6
			ID No. 12				
<3	0.58	...	..	548	59	52	3.7
3	1.15	...	..				
5	2.22	3.8	66				
7	3.02	3.4	60				
9	3.73	3.6	62				
11	5.59	4.1	70	493	45	52	4.1
13	7.90	4.1	78	473	34	49	4.0
15	13.54	4.6	84	455	42	55	4.7
17	24.78	4.4	86	451	44	56	4.8
19	25.49	3.9	84	460	37	52	4.4
21	11.15	3.6	85	480	48	55	4.4
23	.85	...	..	...	..	..	...
Bulk GL	.....	...	..	485	42	52	4.1
Bulk DCS	.....	4.0	78	478	41	52	4.2
			ID No. 13				
<3	0.72	...	..	486	17	38	3.0
3	1.70	...	..				
5	2.25	4.3	76				
7	2.79	4.3	76				
9	2.83	4.2	78				
11	4.09	4.1	82	450	15	40	3.4
13	6.74	4.4	92	446	26	47	4.1
15	11.69	4.2	90	423	28	51	4.7
17	23.82	4.1	94	415	24	50	4.6
19	29.30	3.9	95	424	25	49	4.5
21	12.27	3.6	95	440	28	49	4.3
23	1.80	3.3	94	...	..	..	...
Bulk GL	.....	...	..	440	25	47	4.2
Bulk DCS	.....	4.0	90	441	26	48	4.2

See footnotes at end of table.

TABLE 33.—*Array length distribution, linear density and maturity, and Arealometer parameters of array length groups, samples 2 and 4 to 20 (AMS-W, UT)*[1]—Continued

Length group[3] (1/16 in)	Array			Arealometer[2]			
	Length dist. (pct)	Fineness (µg/in)	Maturity (pct)	A (mm⁻¹)	D (mm⁻¹)	P (µm)	W (µg/in)
			ID No. 14				
<3	0.62	...	..	...	..	..	...
3	1.28	...	..	...	..	..	...
5	2.17	3.7	61	...	..	..	...
7	2.84	3.2	67	...	..	..	...
9	3.46	3.9	70	...	..	..	...
11	4.56	4.1	78	475	32	48	3.9
13	6.64	4.4	78	444	42	56	4.9
15	9.74	4.5	84	434	44	58	5.2
17	17.45	4.7	87	422	29	52	4.7
19	28.21	4.3	90	430	38	56	5.0
21	18.38	4.0	89	451	40	54	4.6
23	4.65	3.6	86	464	46	56	4.6
Bulk GL	.....	...	..	457	37	52	4.4
Bulk DCS	.....	4.2	82	452	38	53	4.5
			ID No. 15				
<3	0.62	...	..	...	..	..	...
3	1.30	...	..	...	..	..	...
5	3.21	4.8	76	...	..	..	...
7	4.20	4.8	82	...	..	..	...
9	4.60	5.1	88	...	..	..	...
11	6.92	5.4	88	409	28	53	5.0
13	8.89	5.5	90	400	31	56	5.4
15	12.32	5.3	94	395	27	54	5.3
17	15.71	5.0	93	396	26	53	5.2
19	14.46	4.7	94	396	29	55	5.4
21	16.07	4.8	96	398	27	54	5.2
23	8.44	4.5	98	412	32	55	5.1
25	2.37	4.1	96	...	..	..	...
27	.89	4.1	96	...	..	..	...
Bulk GL	.....	...	..	415	27	52	4.8
Bulk DCS	.....	4.9	90	419	27	51	4.7
			ID No. 16				
<3	0.44	...	..				
3	.84	...	..	517	40	47	3.5
5	1.95	3.5	65				
7	2.97	3.2	66				
9	3.69	3.8	79				
11	4.84	4.1	74	484	38	50	4.0
13	6.22	4.3	82	466	44	54	4.5
15	9.15	4.3	88	457	38	52	4.4
17	13.63	4.2	90	446	31	50	4.3
19	21.23	3.9	90	443	33	52	4.5
21	22.34	3.9	92	459	38	52	4.4
23	11.15	3.6	90	484	47	54	4.3
25	1.55	3.5	90	...	..	..	...
Bulk GL	.....	...	..	475	36	50	4.0
Bulk DCS	.....	4.0	84	470	38	51	4.2

See footnotes at end of table.

TABLE 33.—*Array length distribution, linear density and maturity, and Arealometer parameters of array length groups, samples 2 and 4 to 20 (AMS-W, UT)*[1]—Continued

Length group[3] (1/16 in)	Array			Arealometer[2]			
	Length dist. (pct)	Fineness (µg/in)	Maturity (pct)	A (mm^{-1})	D (mm^{-1})	P (µm)	W (µg/in)
			ID No. 17				
<3	0.44	...	..	486	21	41	3.2
3	.88	...	..				
5	1.28	3.0	66				
7	2.04	3.8	67				
9	2.39	4.1	73				
11	3.41	5.2	79	453	26	47	4.0
13	4.39	4.9	82	412	29	53	5.0
15	6.87	5.0	88	405	34	57	5.4
17	7.36	4.6	88	390	24	53	5.2
19	18.93	4.9	92	384	26	55	5.5
21	20.04	4.6	92	389	21	51	5.0
23	19.86	4.5	94	395	23	52	5.0
25	8.87	4.1	94	403	30	55	5.2
27	3.24	4.0	96	...	..	..	...
Bulk GL	.....	...	..	417	27	51	4.7
Bulk DCS	.....	4.6	86	408	30	54	5.1
			ID No. 18				
<3	0.67	...	..	544	18	35	2.5
3	1.24	...	..				
5	1.65	2.9	78				
7	2.71	2.9	78				
9	3.42	3.1	81				
11	3.96	3.3	86	502	27	43	3.3
13	4.80	3.3	88	481	7	32	2.6
15	6.85	3.4	89	473	22	42	3.4
17	9.12	3.5	94	458	24	45	3.8
19	14.18	3.5	98	454	22	44	3.7
21	18.05	3.4	98	450	24	46	3.9
23	18.32	3.4	94	454	33	50	4.3
25	11.92	3.2	98	460	37	52	4.4
27	3.11	3.1	96	...	..	..	...
Bulk GL	.....	...	..	475	23	43	3.5
Bulk DCS	.....	3.3	90	478	25	44	3.5
			ID No. 19				
<3	0.67	...	..	562	28	38	2.6
3	1.02	...	..				
5	1.34	2.4	68				
7	2.32	2.5	76				
9	2.36	2.7	80				
11	3.07	2.9	84	515	21	38	2.9
13	3.56	3.0	88	493	24	42	3.3
15	4.18	3.1	90	479	26	44	3.6
17	5.88	3.0	92	473	30	47	3.8
19	8.95	3.1	94	464	25	45	3.7

See footnotes at end of table.

TABLE 33.—*Array length distribution, linear density and maturity, and Arealometer parameters of array length groups, samples 2 and 4 to 20 (AMS-W, UT)*[1]—Continued

Length group[3] (1/16 in)	Array			Arealometer[2]			
	Length dist. (pct)	Fineness (μg/in)	Maturity (pct)	A (mm^{-1})	D (mm^{-1})	P (μm)	W (μg/in)
			ID No. 19 — Continued				
21	13.36	3.2	97	455	23	45	3.8
23	21.19	3.2	98	454	24	45	3.8
25	22.08	3.2	98	465	30	48	3.9
27	8.37	3.1	96	479	35	49	3.9
29	1.65	2.9	98	...	..	..	...
Bulk GL	.....	...	..	464	28	47	3.9
Bulk DCS	.....	3.1	90	484	26	44	3.5
			ID No. 20				
<3	0.80	...	..	644	55	43	2.6
3	1.68	...	..				
5	2.48	2.9	56				
7	3.46	2.7	64				
9	3.86	2.8	66				
11	4.07	2.8	69	575	53	47	3.2
13	4.74	3.6	83	533	50	50	3.6
15	5.58	3.3	78	515	45	50	3.7
17	6.38	3.5	84	500	38	48	3.7
19	8.86	3.7	84	479	43	52	4.2
21	12.00	3.7	90	474	44	54	4.4
23	13.69	3.7	94	467	40	52	4.3
25	15.32	3.6	95	468	37	51	4.2
27	12.44	3.5	94	468	41	53	4.4
29	4.65	3.4	96	...	..	..	...
Bulk GL	.....	...	..	521	42	48	3.6
Bulk DCS	.....	3.4	80	515	45	50	3.7

[1] Array data from AMS-W and Arealometer data from UT; length distributions from Rebenfeld (*26*).

[2] Fibers in length groups <3 to 9 were combined for these measurements.

[3] Bulk GL and DCS: Data on fiber mass which had not been sorted into length groups.

TABLE 34.—*Arealometer parameters of array length groups, selected cotton samples (UT)*

Length group[1] (1/16 in)	A (mm⁻¹)	D (mm⁻¹)	P (μm)	W (μg/in)	A (mm⁻¹)	D (mm⁻¹)	P (μm)	W (μg/in)
	ID No. 22				ID No. 31			
<11	403	36	59	5.6	411	24	50	4.7
11	370	30	60	6.2	390	24	53	5.2
13	357	30	62	6.7	389	25	54	5.3
15	351	32	64	7.1	385	27	56	5.6
17	...	..	..	...	382	26	55	5.6
19	...	..	..	...	381	31	59	6.0
21	...	..	..	...	384	28	56	5.7
23	...	..	..	...	388	32	58	5.8
25	...	..	..	...	392	43	64	6.3
Bulk GL	350	26	60	6.6	382	24	54	5.4
Bulk DCS	383	36	62	6.2	395	30	56	5.5
	ID No. 33				ID No. 36			
<11	347	7	44	4.9	328	11	51	6.0
11	323	5	45	5.4	317	8	50	6.0
13	315	21	63	7.7	316	24	65	8.0
15	327	9	49	5.8	326	24	63	7.5
17	...	..	..	...	329	25	63	7.4
19	...	..	..	...	344	33	66	7.5
Bulk GL	298	5	49	6.3	322	16	57	6.8
Bulk DCS	331	17	56	6.6	328	24	63	7.4
	ID No. 57							
<11	544	42	46	3.3	...	..	..	...
11	485	31	46	3.7	...	..	..	...
13	453	29	48	4.1	...	..	..	...
15	436	22	46	4.1	...	..	..	...
17	431	31	52	4.6	...	..	..	...
19	431	25	48	4.3	...	..	..	...
21	444	32	51	4.4	...	..	..	...
23	462	39	52	4.4	...	..	..	...
Bulk GL	454	25	46	3.9	...	..	..	...
Bulk DCS	464	31	48	4.0	...	..	..	...

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[1] Bulk GL and DCS: Data on fiber mass which had not been sorted into length groups.

TABLE 35.—*Tenacity of array length groups at five gage lengths (Stelometer flat-bundle method), selected cotton samples (UT)*

[Grams-force per tex]

Gage length (in)	1/16-in array length 27	25	23	21	19	17	15	13	Av. all lengths	Lab std.
					ID No. 2					
1/32	...	...	...	...	....	23.6	24.2	22.0	23.3	24.7
2/32	...	...	...	...	....	20.3	19.3	18.5	19.4	21.8
3/32	...	...	...	...	....	18.7	17.4	16.1	17.4	19.8
4/32	...	...	...	...	....	17.4	16.7	14.8	16.3	18.7
5/32	...	...	...	...	....	17.6	15.5	13.4	15.5	18.3
Av.	...	...	...	...	....	19.5	18.6	17.0	....	20.7
					ID No. 4					
1/32	...	...	...	...	28.7	27.8	25.7	24.5	26.7	25.4
2/32	...	...	...	...	25.8	24.3	22.7	21.9	23.7	22.6
3/32	...	...	...	...	25.1	23.2	21.5	20.5	22.6	19.9
4/32	...	...	...	...	22.8	21.7	19.9	19.1	20.9	18.1
5/32	...	...	...	...	22.4	21.1	19.7	18.2	20.4	18.4
Av.	...	...	...	...	25.0	23.6	21.9	20.8	....	20.9
					ID No. 5					
1/32	...	...	...	...	36.6	37.1	35.5	34.8	36.0	25.9
2/32	...	...	...	...	31.0	30.7	30.3	29.6	30.4	21.3
3/32	...	...	...	...	28.9	28.7	27.5	26.5	27.9	19.8
4/32	...	...	...	...	26.5	26.8	26.2	24.7	26.1	20.3
5/32	...	...	...	...	25.9	25.9	24.0	23.2	24.8	18.0
Av.	...	...	...	...	29.8	29.8	26.7	27.8	....	21.1
					ID No. 6					
1/32	...	...	...	...	24.9	24.3	23.3	22.9	23.9	26.1
2/32	...	...	...	...	21.8	20.9	19.9	19.6	20.6	22.6
3/32	...	...	...	...	20.3	19.1	18.7	17.7	19.0	20.9
4/32	...	...	...	...	19.1	17.7	17.0	16.5	17.6	19.2
5/32	...	...	...	...	19.0	17.5	17.2	16.0	17.4	19.3
Av.	...	...	...	...	21.0	19.9	19.2	18.5	....	21.6
					ID No. 7					
1/32	...	...	...	22.3	23.1	21.4	20.9	20.1	21.6	24.8
2/32	...	...	...	19.8	19.6	18.0	17.4	17.5	18.5	22.5
3/32	...	...	...	19.0	17.7	16.8	16.2	15.4	17.0	19.9
4/32	...	...	...	18.4	16.3	15.4	14.9	14.4	15.9	18.8
5/32	...	...	...	17.3	16.2	14.8	14.0	13.6	15.2	17.8
Av.	...	...	...	19.4	18.6	17.3	16.7	16.2	....	20.8
					ID No. 8					
1/32	...	...	...	24.1	23.5	22.0	21.8	20.5	22.4	26.1
2/32	...	...	...	21.4	20.1	18.8	18.5	17.8	19.3	22.6
3/32	...	...	...	19.8	19.0	17.7	16.5	16.1	17.8	20.9
4/32	...	...	...	17.6	17.0	16.1	15.6	14.4	16.1	19.3
5/32	...	...	...	17.9	16.9	15.7	15.0	14.4	16.0	18.6
Av.	...	...	...	20.2	19.3	18.1	17.5	16.6	....	21.5

TABLE 35.—*Tenacity of array length groups at five gage lengths (Stelometer flat-bundle method), selected cotton samples UT*—Continued

[Grams-force per tex]

Gage length (in)	1/16-in array length								Av. all lengths	Lab std.
	27	25	23	21	19	17	15	13		
					ID No. 9					
1/32	...	...	...	....	39.9	38.5	37.3	36.1	38.0	25.5
2/32	...	...	...	....	34.5	33.6	32.1	29.9	32.5	22.6
3/32	...	...	...	32.8	31.8	31.3	29.4	26.7	30.4	21.1
4/32	...	...	...	29.6	30.7	28.3	26.7	24.0	27.9	19.2
5/32	...	...	...	28.5	28.1	26.6	23.9	23.4	26.1	19.0
Av.	...	...	...	....	33.0	31.7	29.9	28.0	....	21.5
					ID No. 10					
1/32	...	...	...	29.6	29.6	28.1	26.9	25.3	27.9	25.4
2/32	...	...	...	26.4	25.3	24.0	21.8	21.0	23.7	22.2
3/32	...	...	...	24.7	22.9	21.2	20.4	17.8	21.4	20.8
4/32	...	...	...	22.5	20.7	19.1	18.1	16.7	19.4	19.7
5/32	...	...	...	20.9	19.8	18.1	17.0	14.9	18.1	18.1
Av.	...	...	...	24.8	23.7	22.1	20.8	19.1	....	21.2
					ID No. 11					
1/32	...	...	...	40.0	40.2	38.8	37.2	34.3	38.1	24.5
2/32	...	...	...	35.5	34.6	33.3	29.9	29.4	32.5	22.7
3/32	...	...	...	33.3	31.0	28.8	27.0	24.5	28.9	21.0
4/32	...	...	...	29.8	28.1	25.6	23.4	21.3	25.6	19.5
5/32	...	...	...	28.1	26.4	24.8	21.8	18.5	23.9	18.9
Av.	...	...	...	33.3	32.1	30.3	27.9	25.6	....	21.3
					ID No. 12					
1/32	...	...	...	31.1	30.6	29.5	29.2	27.3	29.5	25.9
2/32	...	...	...	26.7	25.6	24.8	23.5	23.0	24.7	21.3
3/32	...	...	...	23.9	23.0	22.5	21.8	20.0	22.2	19.8
4/32	...	...	...	22.7	21.4	20.6	19.6	18.2	20.5	20.3
5/32	...	...	...	22.3	20.5	19.4	18.2	17.5	19.6	18.0
Av.	...	...	...	25.3	24.2	23.4	22.5	21.2	....	21.1
					ID No. 13					
1/32	...	...	...	43.9	43.0	41.0	40.1	36.4	40.9	24.5
2/32	...	...	...	39.9	38.0	36.1	33.4	30.3	35.5	22.7
3/32	...	...	...	36.9	35.2	32.6	30.1	27.5	32.5	21.0
4/32	...	...	...	33.9	31.5	30.7	26.9	25.6	29.7	19.5
5/32	...	...	...	31.7	30.7	27.8	26.1	23.2	27.9	18.9
Av.	...	...	...	37.3	35.7	33.5	31.3	28.6	....	21.3
					ID No. 14					
1/32	...	...	29.1	28.7	26.8	25.8	25.0	25.2	26.8	25.4
2/32	...	...	24.9	24.2	23.1	21.7	21.2	20.5	22.6	22.1
3/32	...	...	23.9	22.5	20.7	20.4	19.2	18.3	20.8	20.8
4/32	...	...	22.2	20.9	19.7	18.8	17.0	16.8	19.2	19.7
5/32	...	...	21.2	19.8	18.9	17.3	17.2	15.6	16.3	18.7
Av.	...	...	24.3	23.2	21.8	20.8	19.7	19.3	....	21.3

TABLE 35.—*Tenacity of array length groups at five gage lengths (Stelometer flat-bundle method) selected cotton samples UT*—Continued

[Grams-force per tex]

Gage length (in)	1/16-in array length								Av. all lengths	Lab std.
	27	25	23	21	19	17	15	13		
					ID No. 15					
1/32	...	...	30.3	28.5	27.0	26.3	24.7	23.0	26.6	25.4
2/32	...	...	26.8	24.0	22.2	22.1	21.6	19.5	22.7	21.9
3/32	...	...	24.6	21.8	20.7	20.2	18.8	17.3	20.6	19.9
4/32	...	...	22.0	19.6	19.2	18.8	17.0	15.2	18.6	18.1
5/32	...	...	20.9	19.8	18.4	17.4	16.2	15.2	18.0	18.4
Av.	...	...	24.9	22.8	21.5	21.0	19.7	18.0	....	20.7
					ID No. 16					
1/32	...	...	31.0	30.2	29.4	29.4	28.1	26.9	29.2	24.8
2/32	...	...	26.9	25.6	25.0	24.3	23.6	22.4	24.6	22.5
3/32	...	...	24.4	23.4	22.2	21.3	20.7	19.8	22.0	19.9
4/32	...	...	23.4	21.4	20.3	20.3	18.9	18.5	20.5	18.8
5/32	...	...	22.0	20.4	19.2	18.5	17.8	17.2	19.2	17.8
Av.	...	...	25.5	24.2	23.9	22.8	21.8	21.0	....	20.8
					ID No. 17					
1/32	...	33.5	31.8	30.5	30.2	28.5	27.9	27.1	29.0	25.6
2/32	...	30.1	28.6	27.2	26.4	25.9	24.6	24.2	26.7	22.2
3/32	...	28.6	26.7	25.5	24.4	23.5	22.4	21.9	24.7	21.4
4/32	...	26.1	24.7	23.5	23.5	21.4	20.5	19.6	22.8	19.5
5/32	...	26.5	24.6	23.6	22.6	21.6	20.2	18.5	22.5	19.1
Av.	...	29.0	27.3	26.1	25.4	24.2	23.1	22.3	....	21.6
					ID No. 18					
1/32	...	39.0	36.6	36.0	36.1	35.2	33.0	33.7	35.7	25.9
2/32	...	35.4	33.0	32.0	31.2	32.2	30.6	29.0	31.9	22.3
3/32	...	32.8	32.2	29.2	29.2	27.7	27.2	26.7	29.3	20.0
4/32	...	30.0	28.2	26.9	27.3	26.4	25.7	24.3	27.0	18.5
5/32	...	29.5	28.4	27.7	26.6	26.1	24.8	22.8	26.6	17.8
Av.	...	33.3	31.7	30.4	30.1	29.5	28.3	27.3	....	20.9
					ID No.19					
1/32	40.4	37.8	37.5	35.7	35.3	34.8	33.1	32.4	35.9	25.9
2/32	36.1	34.3	32.9	32.0	32.1	30.8	29.7	29.4	32.2	22.3
3/32	33.0	31.7	30.0	29.3	28.9	28.1	27.9	26.7	29.5	20.0
4/32	30.1	29.4	28.1	26.9	26.1	24.9	25.1	23.8	26.8	18.5
5/32	30.3	28.1	27.6	25.7	25.6	25.1	24.6	23.3	26.3	17.8
Av.	34.0	32.3	31.2	29.9	29.6	28.7	28.1	27.1	....	20.9
					ID No. 20					
1/32	33.1	32.0	30.1	30.5	29.1	28.6	27.6	27.2	29.8	26.1
2/32	29.1	27.9	26.7	26.4	26.0	25.2	24.7	22.8	26.1	21.7
3/32	26.6	25.4	24.0	23.4	23.0	22.3	21.2	20.7	23.3	19.3
4/32	24.5	23.4	22.0	21.9	21.3	20.0	19.0	18.4	21.3	19.0
5/32	23.8	22.2	21.4	20.8	20.7	19.5	18.2	17.1	20.5	17.2
Av.	27.4	26.2	24.8	24.6	24.0	23.1	22.1	21.2	....	20.7

TABLE 35.—*Tenacity of array length groups at five gage lengths (Stelometer flat-bundle method), selected cotton samples UT*—Continued

[Grams-force per tex]

Gage length (in)	1/16-in array length								Av. all lengths	Lab std.
	27	25	23	21	19	17	15	13		
					ID No. 22					
1/32	....	....	....	....	....	....	25.7	24.2	25.0	25.0
2/32	....	....	....	....	....	....	22.8	20.6	21.7	21.8
3/32	....	....	....	....	....	....	20.3	18.6	19.5	20.9
4/32	....	....	....	....	....	....	18.7	16.8	17.8	18.7
5/32	....	....	....	....	....	....	17.9	16.0	17.0	18.5
Av.	....	....	....	....	....	....	21.1	19.2	....	21.0
					ID No. 31					
1/32	....	33.7	32.6	30.5	28.9	28.5	27.8	26.3	29.8	24.7
2/32	....	28.6	27.4	26.2	24.8	24.0	23.6	22.6	25.3	21.8
3/32	....	26.2	24.2	23.5	22.2	21.5	20.5	19.4	22.5	19.8
4/32	....	25.9	23.8	21.7	20.9	20.0	19.2	17.2	21.2	18.7
5/32	....	24.1	21.7	20.4	19.8	18.2	18.0	16.5	19.8	18.3
Av.	....	27.7	25.9	24.5	23.3	22.4	21.8	20.4	....	20.7
					ID No. 33					
1/32	....	....	....	....	....	....	22.8	21.7	22.3	25.0
2/32	....	....	....	....	....	....	18.9	18.4	18.6	21.8
3/32	....	....	....	....	....	....	17.3	16.2	16.8	20.9
4/32	....	....	....	....	....	....	16.9	15.4	16.2	18.7
5/32	....	....	....	....	....	....	16.0	14.7	15.4	18.5
					....	....	18.4	17.3	....	21.0
					ID No. 36					
1/32	....	....	....	....	30.3	29.4	28.3	26.7	28.7	25.0
2/32	....	....	....	....	27.8	27.0	26.0	25.4	26.6	20.9
3/32	....	....	....	....	26.3	24.9	24.3	23.5	24.8	20.9
4/32	....	....	....	....	24.3	23.7	22.7	21.8	23.1	18.7
5/32	....	....	....	....	24.2	22.5	21.9	20.7	22.3	18.5
Av.	....	....	....	....	26.6	25.5	24.6	23.6	....	20.8
					ID No. 57					
1/32	....	....	30.3	30.8	29.0	28.1	27.5	27.4	28.9	26.1
2/32	....	....	26.1	25.1	23.8	23.3	22.2	22.0	23.8	21.7
3/32	....	....	23.2	22.7	21.4	21.0	19.9	19.7	21.3	19.3
4/32	....	....	22.6	20.4	19.3	18.2	17.9	17.0	19.3	18.4
5/32	....	....	21.8	19.8	18.6	17.7	17.0	16.5	18.6	17.2
Av.	....	....	24.8	23.8	22.4	21.7	20.9	20.5	....	20.5

TABLE 36.—*Elongation at 1/8-in gage length of array length groups (Stelometer flat-bundle method), selected cotton samples (UT)*

[Percent]

ID	1/16-in array length									Bulk
No.	27	25	23	21	19	17	15	13	Av.	Sample
2	...	...	....	....	....	7.9	8.3	8.8	8.3	8.4
4	...	...	....	....	10.6	12.5	12.6	13.1	12.2	11.4
5	...	...	....	....	7.1	7.2	7.9	8.0	7.6	7.7
6	...	...	....	....	10.2	11.7	11.3	11.1	11.1	10.3
7	...	...	....	10.4	11.8	13.2	12.5	12.1	12.0	11.2
8	...	...	....	9.5	10.7	12.0	11.5	11.2	11.0	9.8
9	...	...	....	7.2	8.0	7.3	7.2	6.9	7.3	6.7
10	...	...	....	7.4	7.7	7.7	8.2	8.3	7.9	6.9
11	...	...	....	6.1	6.4	6.6	6.3	6.5	6.4	5.7
12	...	...	....	8.3	9.0	8.4	7.9	7.4	8.2	8.2
13	...	...	....	8.0	7.4	7.8	7.7	7.4	7.7	6.7
14	...	...	10.6	10.5	11.1	11.0	9.8	9.5	10.4	9.8
15	...	...	8.7	10.3	10.3	10.5	10.9	10.6	10.2	9.4
16	...	...	8.5	8.7	9.5	9.0	9.3	9.1	9.0	8.1
17	...	8.0	9.2	10.3	10.1	10.8	10.0	10.1	9.8	9.1
18	...	8.4	9.3	10.0	10.1	10.1	10.1	9.6	9.7	9.0
19	8.3	9.3	9.6	9.2	9.0	9.0	9.1	8.7	9.0	8.2
20	8.9	9.6	9.9	9.8	8.4	8.7	9.5	8.9	9.2	9.5
22	...	...	....	....	....	....	9.0	9.7	9.4	9.3
31	...	7.8	9.1	9.7	9.9	10.1	9.9	10.0	9.5	9.2
33	...	...	....	....	....	....	9.0	9.5	9.3	....
36	...	...	....	....	12.9	13.4	14.0	14.3	13.7	11.8
57	...	...	7.5	7.5	7.5	8.2	7.5	7.7	7.7	7.3

TABLE 37.—*Specific area fineness, cotton samples 1 to 59, experimental fineness instruments (UT)*

[mm^{-1}]

ID No.	Through-flow Speedar			Standard Speedar			Port-Ar		
	GL	Hand opened, SDS	Blended, SDS	GL	Hand opened, SDS	Blended, SDS	GL	Hand opened, SDS	Blended, SDS
1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2	318	325	331	339	333	332	316	308	302
3	395	400	414	408	415	415	393	401	399
4	349	340	362	342	353	356	329	332	330
5	335	342	349	353	351	348	329	321	319
6	450	467	480	470	478	486	461	471	460
7	416	421	440	437	440	440	418	422	417
8	422	410	418	425	417	418	417	411	403
9	456	472	478	476	493	485	468	468	468
10	379	385	390	385	397	398	381	377	371
11	500	500	510	525	531	524	503	494	491
12	458	465	478	478	492	485	470	471	461
13	418	433	441	440	457	451	424	431	429
14	430	445	455	445	459	460	441	444	440
15	393	399	414	392	416	419	391	401	395
16	459	460	472	475	473	485	458	459	458
17	393	401	415	394	403	420	393	390	392
18	460	476	484	455	497	504	459	473	472
19	459	477	494	461	507	500	462	475	475
20	510	511	526	491	538	540	495	510	498

See footnote at end of table.

TABLE 37.—*Specific area fineness, cotton samples 1 to 59, experimental fineness instruments (UT)* —Continued

[mm^{-1}]

ID No.	Through-flow Speedar			Standard Speedar			Port-Ar		
	GL	Hand opened, SDS	Blended, SDS	GL	Hand opened, SDS	Blended, SDS	GL	Hand opened, SDS	Blended, SDS
21	293	311	319	(1)	319	322	(1)	(1)	(1)
22	332	367	374	318	365	373	313	345	. . .
23	415	425	432	422	434	440	410	416	413
24	551	548	562	579	565	571	546	543	534
25	450	432	438	454	441	440	471	434	422
26	436	457	468	440	477	476	440	457	452
27	447	452	465	447	459	465	454	456	441
28	451	451	466	460	472	469	456	459	446
29	453	454	464	467	462	469	463	453	441
30	465	464	478	479	486	487	467	469	460
31	375	384	393	364	382	394	362	373	371
32	515	519	529	514	539	539	508	507	505
33	299	323	329	301	324	335	(1)	313	(1)
34	426	430	441	429	436	447	435	427	422
35	431	437	450	440	450	456	436	443	432
36	310	318	325	330	313	330	315	315	. . .
37	422	440	455	439	466	458	431	443	437
38	428	437	457	451	452	456	435	441	473
39	460	482	494	469	513	499	469	487	476
40	450	473	478	461	478	482	458	464	463
41	416	422	440	422	434	452	419	427	422
42	401	417	420	411	428	428	409	410	397
43	449	449	460	452	473	481	455	445	449
44	425	418	435	424	437	432	427	429	420
45	441	432	448	441	455	456	439	437	429
46	419	428	441	426	451	444	418	425	420
47	418	418	427	425	436	446	427	420	417
48	411	425	440	430	445	441	421	420	419
49	413	422	425	423	423	424	412	413	410
50	456	464	473	472	488	492	470	467	458
51	433	440	451	449	456	449	438	431	427
52	436	429	434	442	442	448	438	433	422
53	407	425	438	391	431	446	403	429	419
54	486	499	508	493	520	518	485	484	490
55	487	481	496	498	502	504	483	478	476
56	470	475	485	488	484	495	479	476	470
57	436	453	468	452	478	477	442	457	452
58	369	387	394	379	398	398	379	379	370
59	456	451	472	482	481	483	476	461	455

[1] Off scale, too coarse.

TABLE 38.—*Linear density and tenacity of 50-gram laps, master cotton samples (UT)*

ID No.	Lap linear density (tex$\times 10^4$)	Lap strength, Instron (gf)		Lap tenacity, Instron (gf/tex$\times 10^{-2}$)	
		Parallel	Perpendicular	Parallel	Perpendicular
1	3.19	625	234	1.96	0.73
2	3.25	681	146	2.10	.45
3	3.17	741	132	2.34	.42
4	3.19	846	171	2.65	.54
5	3.15	540	104	1.71	.33
6	3.25	717	98	2.21	.30
7	3.15	678	103	2.15	.33
8	3.16	689	94	2.18	.30
9	3.18	670	98	2.11	.31
10	3.25	673	118	2.07	.36
11	3.19	709	86	2.22	.27
12	3.13	636	92	2.03	.29
13	3.21	811	116	2.53	.36
14	3.17	749	102	2.36	.32
15	3.30	952	126	2.88	.38
16	3.24	823	99	2.54	.31
17	3.27	834	110	2.55	.34
18	3.40	974	92	2.86	.27
19	3.19	957	93	3.00	.29
20	3.32	922	98	2.78	.30

TABLE 39.—*Width, thickness, compressibility, and resilience of 50-gram laps, master cotton samples (UT)*

ID No.	Lap width (in)	Lap thickness (in) under loads of—			Compressibility (pct)	Compressional resilience (pct)
		20 g (T_a)	420 g (T_b)	20 g (T_c)		
1	7.5	2.68	1.43	2.35	46.6	73.6
2	8.0	3.67	1.68	3.05	54.2	68.8
3	9.0	3.74	1.56	3.03	58.3	67.4
4	9.0	3.48	1.57	2.91	54.9	70.2
5	10.0	4.07	1.38	3.22	66.1	68.4
6	10.0	3.73	1.42	2.90	62.9	64.1
7	9.5	3.73	1.50	2.95	59.8	65.0
8	10.0	3.57	1.33	2.80	62.7	65.6
9	10.0	3.97	1.59	3.18	55.4	72.3
10	10.0	3.98	1.44	3.20	63.8	69.3
11	9.0	3.93	1.50	3.13	61.8	67.1
12	9.5	3.76	1.41	2.95	62.5	65.5
13	10.0	3.93	1.46	3.12	62.8	67.2
14	10.5	3.62	1.33	2.85	63.2	66.4
15	9.5	3.40	1.30	2.69	61.8	66.2
16	10.0	3.69	1.35	2.80	63.4	62.0
17	10.0	3.91	1.40	3.04	64.2	65.3
18	10.0	3.79	1.36	2.88	64.1	62.6
19	10.0	3.47	1.28	2.76	63.1	67.6
20	11.5	3.38	1.25	2.57	63.0	62.0

TABLE 40.—*Frictional properties, selected cotton samples (UT)*

ID No.	Ski-run friction (in)	Shear friction ($S \times 10^{-4}$)	Penetration (mm)	
			Constant pressure	Constant thickness
1	13.4	....	7.28	11.0
2	12.0	1.71	8.80	11.5
3	11.4	1.77	6.57	11.3
4	11.6	....	8.20	13.1
5	11.2	1.62	6.42	19.1
6	10.6	2.03	5.10	12.6
7	11.3	2.01	6.32	13.2
8	11.0	1.91	5.45	17.1
9	10.8	1.74	6.78	12.4
10	11.0	1.51	7.00	15.2
11	10.6	1.62	5.27	11.9
12	11.1	1.78	5.95	13.2
13	10.9	1.64	5.80	12.4
14	11.4	1.86	5.82	15.2
15	11.1	1.85	5.08	14.8
16	10.7	1.76	5.05	16.2
17	11.1	1.72	6.70	16.7
18	10.4	2.00	4.40	13.4
19	10.4	1.82	5.18	15.0
20	10.6	1.99	4.18	15.4
22	11.8	....	....	....
23	....	2.12	....	....
24	....	1.74	....	....
26	10.8	2.02	....	....
27	....	1.82	....	....
28	....	1.90	....	....
29	....	1.88	....	....
30	....	1.72	....	....
31	10.7	1.75	....	....
32	10.8	1.82	....	....
33	11.9	....	....	....
36	11.8	1.79	....	....
57	10.9	....	....	....

TABLE 41.—*Effect of processing and brushing on crimp, selected cotton samples (UT)*

[Percent]

ID No.	GL			DCS	
	Not brushed	Blended, not brushed	Blended and brushed	Not brushed	Brushed
4	8.4	6.6	5.4	4.1	3.0
5	8.5	7.4	5.3	4.0	2.8
7	10.0	8.4	6.3	4.2	3.3
8	9.6	8.9	6.5	4.3	3.2
9	9.1	7.6	5.6	3.8	2.5
12	9.2	7.0	5.3	3.7	3.1
16	9.5	7.4	5.8	3.7	3.0
18	9.0	5.2	4.2	3.9	2.5
23	10.1	8.1	5.9	4.5	3.6

ABBREVIATIONS, SYMBOLS, AND DEFINITIONS

Laboratories Contributing Data to the Research

AMS-C	Cotton Fiber and Spinning Laboratory, Agricultural Marketing Service, U.S. Department of Agriculture, Clemson, S.C. (1971 array data).
AMS-W	Cotton Fiber Laboratory, Agricultural Marketing Service, U.S. Department of Agriculture, Washingotn, D.C. (1958 array data).
CFL	Cotton Fiber Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Knoxville, Tenn.
CQL	Cotton Fiber Quality Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Md.
KSL	Cotton Spinning Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Knoxville, Tenn.
SRRC	Southern Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture, New Orleans, La.
TRI	Textile Research Institute, Princeton, N.J.
UT	University of Tennessee Fiber Research Laboratory, Knoxville, Tenn.

Growth Location Codes

BR	Brawley, Calif.
CO	Chickasha, Okla.
CS	College Station, Tex.
EX	Experiment, Ga.
FL	Florence, S.C.
KX	Knoxville, Tenn.
LU	Lubbock, Tex.
MA	Marianna, Ark.
RL	Raleigh, N.C.
SC	State College, N. Mex.
SH	Shafter, Calif.
SO	Stoneville, Miss.
TF	Tifton, Ga.
TM	Tempe, Ariz.
U	Iguala, Mexico

Other Symbols and Abbreviations

A	Arealometer: "A is a measure of the external surface area of the fibers of a given volume of fibrous material, expressed in terms of square millimeters per cubic millimeter [mm^{-1}] of fibrous material" (*29*).
$+b$	Colorimeter: "Hunter's $+b$ value is a measure of increasing yellowness of the cotton" (*29*).
cv	Coefficient of variation, in percent.
D	Arealometer: "Difference between the value of the specific area determined at high pressure (A_H) and the value of the specific area determined at standard pressure (the A measured above). D is presumably a measure of the flatness of the fiber ribbon; that is, the higher the D value, the more ribbonlike are the fibers" (*29*). Expressed in square millimeters per cubic meter (mm^{-1}).
DCS	Double-carded sliver: A randomly selected subsample of each cotton sample was carded, the slivers combined, recarded, and combined again to produce a well-blended sample on which many of the fiber measurements were made.
E_1	"The percentage elongation at break of the center 1/8 inch of the fiber bundle measured for T_1 strength on the Stelometer" (*29*).
G	Gage length, in inches, used in fiber and yarn strength testing instruments.
gf/tex	Unit of strength. See T_0 and T_1.
GL	Ginned lint.
ID No.	Cotton sample identification number.
Mean	Array mean length: "The average length [in inches] of all the fibers in the test specimen based on weight-length data" (*1*). Fibrograph: "The average length in inches of all fibers longer than 1/4 inch" (*29*).
μg/in	Micrograms per inch. The units used for reporting linear density measurements.
P	Perimeter of fiber in micrometers, calculated from Arealometer A and D. $P=12{,}566I/A$, where $I=\sqrt{(0.07D+1)}$.
R_d	Colorimeter: "R_d is a measure of the percentage of reflectance; the higher the value, the lighter is the cotton" (*29*).
RH	Relative humidity, in percent.
S	Shear friction: A parameter obtained from placing a lap of cotton in oscillating shear and measuring the decaying amplitude of an attached pendulum. S is calculated by an empirical formula that involves the amplitude, load, thickness, and area of the lap.
SDS	Second-drawing sliver: At the time these samples were prepared, the second-drawing sliver was the finisher drawing.
SL	Span length: "Length [in inches] measured on the Digital Fibrograph. The distance spanned by a specified percentage of the fibers in the test specimen where the initial starting point of the scanning in the test is considered 100 percent" (*29*). 2.5-pct SL: Fibrograph 2.5-percent span length: "The length in inches on the test specimen spanned by 2.5 percent of the fibers scanned at the initial starting point. The 2.5-percent span length approximates classer's staple" (*29*). When 2.5-percent span length is measured, the starting point is 0.150 inch from the clamping position of the fibers. 50-pct SL: Fibrograph 50-percent span length: "The length in inches on the test specimen spanned by 50 percent of the fibers scanned at the initial starting point" (*29*). 3.1-pct. SL: Fibrograph 3.1-percent span length: The length in inches on the test specimen spanned by 3.1 percent of the fibers scanned at the initial starting point. Some of the early data on the Digital Fibrograph were taken with a starting position of 0.250 inch. A 3.1-percent span length at this starting posi-

	tion is essentially the same as a 2.5-percent span length at a starting position of 0.150 inch.
T	Thickness, in centimeters, of a doubly folded miniature lap.
T_a	Thickness of lap loaded with 20 grams, in inches.
T_b	Thickness of lap loaded with 420 grams, in inches.
T_c	Thickness of lap unloaded to 20 grams, in inches.
T_0	"The fiber strength [in grams-force per tex] of a bundle of fibers measured on the Stelometer with the two jaws holding the fiber bundle tightly appressed" (*29*).
T_1	"The fiber strength [in grams-force per tex] of fibers measured on the Stelometer with two jaws holding the fiber bundle separated by a 1/8-inch spacer" (*29*).
tex	"A measuring unit for fibers, filaments, and yarns based on weight in grams of 1,000 meters of fiber or yarn" (*29*).
TM	Twist multiple: The turns per inch divided by the square root of the cotton count. (The cotton count of 27-tex yarn is 22.)
UHM	Fibrograph upper-half mean: "The length in inches of the half of the fibers, by weight, that contains the longer fibers. Values of UHM approximate classer's staple and also 2.5-percent span length" (*29*).
UQL	Array upper-quartile length: "That length [in inches] which is exceeded by 25 percent of the fibers, by weight, in the test specimen" (*1*).
W	Weight fineness, in micrograms per inch, calculated from the Arealometer A and D. $W=485{,}000I/A$, where $I=\sqrt{(0.07D+1)}$.

Identification of Cotton (Gossypium *L.*) *Samples*

ID No.	Location-year	Cultivar or strain	Species
1	SO-57	'Garo Hill'	*G. arboreum.*
2	KX-56	'DeRidder Red'	*G. hirsutum.*
3	CO-57	CR-4-C	Do.
4	U-54	'Lengupa'	*G. barbadense.*
5	MA-57	NR-AHA-C	*G. hirsutum.*
6	LU-57	'Paymaster'	Do.
7	SC-57	SL(SLS)1000	Do.
8	LU-57	'Lankart'	Do.
9	BR-57	A4-42-176	Do.
10	SO-57	'Bobshaw 1-A'	Do.
11	BR-57	THEF 96	Do.
12	SH-57	A4-42-176	Do.
13	BR-57	HA-46-124	Do.
14	SO-57	'Deltapine 15'	Do.
15	U-51	Peruvian Tanguis	*G. barbadense.*
16	SC-57	'Acala 1517C'	*G. hirsutum.*
17	TF-57	Coastland RN × ET	*G. barbadense.*
18	TM-57	'Pima S-1'	Do.
19	TM-57	'Amsak'	Do.
20	SH-57	'Old Pima'	Do.
21	SO-57	A2-47	*G. arboreum.*
22	U-57	Iguala 481 DES 726	*G. hirsutum.*
23	EX-57	'Stoneville 3202'	Do.
24	BR-57	Cal 6-1-5	*G. hirsutum.*
25	CO-57	'Stoneville 62'	Do.
26	SC-57	'Deltapine 15'	Do.
27	RL-57	TH-146-24-2	Do.
28	TF-57	'Empire'	Do.
29	SH-57	Cal 6-1-5	Do.
30	SC-57	Acala 1028	Do.
31	U-57	'Tanguis'	*G. barbadense.*
32	SC-57	'Hybrid 330'	*G. hirsutum.*
33	U-57	Iguala 480 DES 725	Do.
34	CO-57	'Lankart'	Do.
35	SC-57	'Stoneville 3202'	Do.
36	U-57	'Lengupa'	*G. barbadense.*
37	TF-57	'Plains'	*G. hirsutum.*
38	SO-57	'Stoneville 3202'	Do.
39	CS-57	Dryland 'Deltapine 15'.	Do.
40	SO-57	'Pope'	Do.
41	CS-57	Dryland 136B	*G. hirsutum.*
42	SC-57	'Moores Special'	Do.
43	RL-57	TH-150-7-1	Do.
44	EX-57	'Empire WR'	Do.
45	CS-57	Irrigated 'Deltapine 15'	Do.
46	TF-57	'Stoneville 7'	Do.
47	CS-57	Irrigated 136B	Do.
48	TF-57	'Coker 100W'	Do.
49	SO-57	DES 1000	Do.
50	CS-57	Dryland DA-45	Do.
51	SO-57	'Stoneville 7'	Do.
52	EX-57	'Stoneville 7'	Do.
53	EX-57	'Coker 100W'	Do.
54	LU-57	'Blightmaster'	Do.
55	SH-57	THEF 96	Do.
56	SO-57	'Empire'	Do.
57	CS-57	Irrigated DA 45	Do.
58	MA-57	C(2) BBR-55-21	Do.
59	SH-57	HA-46-124	Do.
60	FL-58	'Earlistaple'	Do.
61	FL-58	'Hybrid 330'	Do.
62	FL-58	'Sealand 542'	Do.

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